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VOL. 117 AUGUST 1955 NO. 2

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VOL. 117 August, 1955 NO. 2

MILITARY MEDICINE

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Adrenocortical Response in War Wounds*

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IT IS the purpose of this paper, to present our experience in the evaluation of delayed adrenal cortical integrity in severe complicated war wounds as determined by the circulating eosinophil count, and the 4 hour ACTH test of Thorn.

There has been increasing interest in the role of the adrenal cortex in response to various manifestations of stress since 1946. At that time Selye[1] called renewed attention to the part played by the adrenal cortex in the "alarm reaction," originally described by him in 1937, as a phase of the more generalized "adaptation syndrome."[2] Simultaneously, endocrinologists were supplied with material with which to investigate the cortical response in humans, when Armour Laboratories developed a process whereby relatively large quantities of ACTH could be produced from the pituitary gland of the hog, using a modification of the original isoelectric precipitation method of Sayers, et al.[3]

Browne,[4] in 1943, had described certain effects of the administration of this hormone on adrenal function. The exhaustive work of Thorn, et al.,[5] and Mason, et al.,[6] was quick to follow once a more adequate supply of the hormone was available.

Marked decrease of circulating eosinophils following administration of ACTH in humans with unimpaired adrenal cortical function was elicited by Forsham, et al.,[7] as a constant feature of more generalized hematologic changes. On the basis of this feature, and an equally constant increase in excretion of uric acid described in similar studies from the same laboratory, Thorn and collaborators[8] standardized a clinical test for adrenal cortical integrity (1948). This test measured the actual drop in the number of circulating eosinophils, as detected by direct count, and the increase in the uric acid-creatinine ratio of the urine, 4 hours following the administration of a standardized dose of ACTH (25 mgm.), the maximum change in these two factors having been found to occur at such an interval.

Following subsequent studies by Thorn, et al.,[9] the uric acid-creatinine component has been eliminated from the test, and more emphasis placed on the fluctuations in the eosinophil count. Roche, et al.,[10] in studies performed on elective major surgical cases, described eosinopenia, beginning during surgery, and persisting for 2-3 days postopera-

* Read by title at the 61st Annual Convention, Association of Military Surgeons of the United States, Hotel Statler, Washington D.C., November 28-December 1, 1954. The opinions expressed herein are those of the authors and not necessarily those of the Department of the Navy. Based on work done at the U. S. Naval Hospital, Yokosuka, Japan.

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tively, with a rising count about the 4th to 5th day, coinciding with clinical improvement in the patient. A normal (100-250 per cu. mm.) or increased eosinophil count during the first 24-48 hours following surgery, or stress by other significant types of trauma, is said to indicate adrenocortical insufficiency. The veracity of these impressions may be checked by the 4 hour ACTH test, in which a drop of less than 50% in the eosinophil count 4 hours following the intramuscular injection of 25 mgm. of the hormone, is considered to reflect an exhaustion of adrenocortical reserve.

In patients exhibiting a poor response to the 4 hour test, and in cases wherein a more exhaustive study of adrenal function is required, as in suspected Addison's disease, Thorn, et al.,[9] perform a 48 hour test, in which eosinophil counts are computed at intervals, and in addition, excretion of 17-ketosteroids is measured in 24 hour urine specimens, during continuous cortical stimulation by repeated small doses of ACTH. Other accessory tests include a 4 hour eosinophil response to adrenal cortical extract, or to an injection of 0.3 mgm. of epinephrine, which acts indirectly on the adrenal cortex by stimulating the secretion of ACTH from the anterior pituitary. A discrepancy between the results of the ACTH and epinephrine tests might indicate an exhausted, or otherwise refractory anterior pituitary, in the presence of a normal adrenal.[10]

Since the standardization of the Thorn test, it has been extensively utilized in the study of cortical function as influenced by many and varied types of stress, including elective surgery,[10] burns,[11] and orthopedic procedures.[12] In general, these studies reflect a biphasic response, with a period of reaction to stress, followed after several days, in the uncomplicated case, by a period of convalescence in which the adrenal cortex has regained its normal state and function. As reflected by the eosinophil count, a persistent eosinopenia beyond the normal period of stress suggests developing complications, and eosinophilia in the presence of an unsatisfactory clinical course indicates probable adrenocortical insufficiency secondary to exhaustion.[12]

At the date of this writing, no study of adrenal stress resulting from the complex wounds of war has been reported. The multiplicity and frequent severity of such wounds, and the expected high incidence of complication, in men already subjected to pronounced emotional stress, tend to make this a most interesting group for study.

Material Available for Study

Available for study at a large U. S. Naval Hospital, serving the naval and marine forces in the Far East, were the records of 51 patients, injured in Korea, whose workup during hospitalization included the 4 hour ACTH test. Comprising the series were 25 compound fractures, many multiple, including 8 requiring major amputation, 16 penetrating wounds of the chest and/or abdomen, 3 of which had associated compound fractures, and 10 complex flesh wounds, with significant tissue loss, or injury to major nerve or vessel. All were young, previously healthy, navy or marine corps personnel.

All patients had received emergency surgical treatment at medical company hospitals in Korea, or aboard hospital ships, and arrived at this facility a number of days following injury. Thorn tests (4 hour) were performed 9-88 days following initial injury, many of the patients having undergone one or more subsequent surgical procedures at this hospital, including secondary closures, skin grafting, open reductions, and various intra-thoracic and intra-abdominal procedures prior to the tests. There were no fatalities in the group. All patients were eventually evacuated to the continental United States, except one, who was able to return to duty two months following his injury. One patient received cortisone therapy, as a result of severely altered adrenal function and deteriorating clinical condition.

Wherever possible, tests were repeated after 10-25 days in those patients showing poor response initially. This was impossible

in many instances, due to established policy which allowed patients with sufficiently satisfactory clinical status to be evacuated as early as possible. Of the entire series of 51 patients, 25 had unsatisfactory response to the initial ACTH test. Tests were repeated one or more times in 10 of these.

In performing the eosinophil counts, the technic of Randolph[13] was used. In brief, the method employs oxalated venous blood diluted in a white cell pipette with a special diluting fluid, containing methylene blue and phloxine dissolved in propylene glycol. A direct chamber count is made, the average of 4 chambers is multiplied by the diluting factor, yielding the number of circulating eosinophils per cubic millimeter of blood. All counts were made after at least 4 hours of fasting.

Results

In most cases, the usually described correlation between the initial eosinophil count, and the response to ACTH was found. Of 25 patients showing a poor response, 19 had an initial count above 250, 5 had counts between 100-250, and only one had an initial count below 100 (99). Four patients had an extremely poor response, the eosinophil count falling less than 20% after ACTH. Of these, the initial counts were 352, with 10% fall, 396, with 17%, 495, with 11%, and 220, with 15%. Of the 26 patients showing a good response to the test, the initial eosinophil count was above 250 in 19, 100-250 in 6, and below 100 in only one (88).

Results were evaluated from several aspects, designed to include the various organic factors which might conceivably effect adrenal stress. In most cases there were various combinations of these factors, as seen in tables I and II, so that accurate evaluation of individual factors was quite difficult.

Type of Injury

Among the 25 patients exhibiting an unsatisfactory response, 11 had one or more compound fractures, 4 of whom had been subjected to major amputations. These comprised 44% of the entire orthopedic series, and 50% of the amputations. In 9 patients, including the 4 amputees, the initial eosinophil count was in excess of 250/cu. mm. The two remaining patients showed initial counts within the normal range of 100-250.

A similar series of 11 patients had penetrating wounds of chest and/or abdomen. In two of these there were associated, infected major compound fractures. Again, 9 had initial counts above 250, while two, including one with associated fracture, had counts between 100-250. The 3 remaining patients in this series had extensive flesh wounds, with loss of skin or muscle, and wound infections. In two of these, the initial count was below 250/cu. mm.

The 26 patients showing satisfactory response included 14 compound fractures, 4 with major amputations, one of whom (No. 9, Table II) had undergone bilateral midthigh guillotine amputation at a field installation in Korea, 3 weeks prior to the test. This patient, as did 3 of the more complicated, infected compound fractures, showed initial eosinophil counts below 250. There were 5 penetrating chest and abdomen wounds, two of which were associated with extensive flesh wounds. These two patients had initial counts below 250, and one of them was the only patient among the satisfactory group to show an initial count below 100. This patient (No. 6, Table II) whose initial count of 88 showed a 75% fall in response to ACTH, reflected good cortical reserve despite an extremely complicated and prolonged recovery following complete laceration of the superficial femoral artery and vein, for which arterial anastomosis and vein ligation were performed. Subsequent ligation of the profunda artery and deep femoral vein, with lumbar sympathectomy was required one month following injury, two weeks prior to Thorn test.

The 7 remaining patients in the satisfactory group had extensive flesh wounds, 6 showing initial counts above 250. These, compared with only 3 patients with unsatisfactory response in wounds of this category,

TABLE I

PATIENTS SHOWING UNSATISFACTORY RESPONSE TO 4 HOUR ACTH TEST

No.	Type of Injury	Initial Count EOS/C.M.	Fall %	Interval Since Injury (days)	Surg. Since Injury (No.)	Major Surg. Past Week	Open Wounds	Infection	Anemia	Remarks
1	Chest, with hemothorax	121	46	25	1	—	—	—	—	
2	Amp. thigh; mult. wds. opp. leg.	352	10	88	2	—	X	X	—	Renal failure septicemia, cortisone treatment.
3	Comp. frac. tibia & fibula	605	42	24	1	X	X	—	—	
4	Chest; mult. extrem. wds.	660	33	27	1	—	X	—	—	
5	Amp. foot, 4 fingers; mult. extrem. wds.	462	48	25	1	—	X	—	X	
6	Frac. tibia; avulsions, leg and arm.	495	11	26	1	X	X	X	X	
7	Chest penetrating.	792	38	17	—	—	X	X	—	Repeat +12 days, 1050, 44% fall; improved clinically.
8	Frac. femur; mult. wds. extrem.	286	31	18	—	—	X	—	X	Repeat +25 days, 440, 38% fall, improved clinically.
9	Chest+abdomen, Lac. kidney.	374	41	25	—	—	X	X	—	Lobectomy 11 days before admission repeat +10 days 209, 48% fall improved clinically.
10	Frac. tibia, fibula; mult. wds. extrem.	198	45	19	1	X	—	—	—	
11	Chest, metal fragment mediastinum; com. frac. of humerus.	99	33	81	2	—	—	—	X	Thoracotomy, 39 days before test. Delayed lung expansion.
12	Penetrating abdomen; bowel, bladder lac.	376	36	21	—	—	X	X	—	Repeat +14 days, 10 days after lysis adhesions 150, 5% fall. Repeat +11 days, 99, 33% fall. Improved clinically.
13	Comp. frac. tibia, bilat.	220	15	13	—	—	—	—	X	RBC 2.73 mil. Hgb. 8.5 gms.
14	Mult. frac. disloc. foot; mult. wds. extrem.	726	37	25	2	X	—	—	X	Repeat +13 days, 300, 27% fall despite clinical improvement.
15	Chest, abdom.	396	33	26	—	—	X	—	X	
16	Chest, penetrating	858	36	17	—	—	—	—	—	Bronchopleural fistula, closed spont.
17	Amp. thigh; frac. tibia+fibula opp. leg.	616	40	30	—	—	X	X	X	Repeat +12 days, 400, 50% fall; improved clinically.
18	Penetrating abdomen; frac. metatarsals.	396	17	31	—	—	X	X	X	Trans. colostomy for lacerated bowel.
19	Chest; abdom.; mult. wds. arms.	352	44	30	1	—	—	—	—	Rt. colectomy I+D pelvic abscess 6 days before adm.
20	Mult. wds. legs, buttock, groin	616	34	21	—	—	X	X	—	Repeat +20 days. 616, 22% fall, improved. Repeat +13 days 600, 75% fall.

TABLE I—(*continued*)

No.	Type of Injury	Initial Count EOS/C.M.	Fall %	Interval Since Injury (days)	Surg. Since Injury (No.)	Major Surg. Past Week	Open Wounds	Infection	Anemia	Remarks
21	Frac. humerus, feet; mult. wds., back +extrem.	660	33	22	1	—	—	—	X	Repeat +15 days 1672, 60% fall. Improved clinically.
22	Mult. wds. all extrem.	187	41	9	—	—	X	—	X	Repeat +20 days 506, 31% fall. Clinically improved.
23	Mult. wds. back; legs.	176	38	9	—	—	X	—	—	Repeat +days 396, 27% fall. Clinically improved.
24.	Chest, nonpenetrating.	1012	44	23	—	—	X	X	—	
25.	Amp. BK left; Frac. tibia +fibula, right.	396	28	30	2	X	X	—	—	

suggest that flesh wounds, without fracture or penetration of body cavities, are less likely to exert exhaustive adrenocortical response than are wounds of more complex nature.

Interval Since Injury

There was no clear cut correlation between the time interval since initial injury, and the eosinophil response, although there were suggestive trends. In 6 patients showing a low eosinophil count and a poor response to ACTH, the interval was 9-81 days. However, with the exception of one patient, the interval was 9-26 days, averaging 15.2 days. This patient (No. 11, Table I) had a penetrating wound of the chest, associated with a severely comminuted compound humeral fracture. He had undergone multiple operative procedures during the 81 day interval, the last, a thoracotomy and mediastinotomy, 39 days prior to the test. With convalescence retarded by anemia, debility, and the necessity of immobilization of an upper extremity, his initial eosinophil count of 99 showed a fall of 33% to ACTH stimulation.

In the 19 patients showing a poor fall after initial eosinophil count in excess of 250/cu. mm., the interval between injury and test ranged 17-88 days, with an average of 27.7 days, almost twice the corrected average of the low count group.

In the series with satisfactory response, the interval was 10-60 days. The 19 patients of this group with initial eosinophil count above 250, had an average interval of 22.7 days, the interval averaged 26.6 days in the 7 patients with low initial counts, reflecting continuing stress, but capable reserve for periods up to, and in several cases exceeding, one month post injury.

Intercurrent Operations

In the entire series of 51 patients, 31 underwent one or more surgical procedures at this hospital, prior to the test. Fourteen patients underwent a major procedure within one week preceding the test.

Of the 25 patients with unsatisfactory Thorn tests, 12 had one or more intercurrent operations, 5 of whom were subjected to a major procedure within 7 days of the test. Only 3 of the former group, and one of the latter (No. 10, Table I) had eosinophil counts below 250.

In the satisfactory group the figures were similar. Five of 19 patients having had intercurrent procedures, and two of 9 having had a major operation during the preceding week, had initial counts below 250, the remainder showing renewed cortical integrity, both by the initial count, and response to stimulation.

Presence of Open Wounds

There was a suggestive correlation between the presence of large open wounds,

TABLE II

PATIENTS SHOWING SATISFACTORY RESPONSE TO 4 HOUR ACTH TEST

No.	Type of Injury	Initial Count EOS/C.M.	Interval Since Injury (days)	Surg. Since Adm. (No.)	Major Surg. Past Week	Open Wounds	Infection	Anemia	Remarks
1	Penet. chest +abd. mult. wds. extrem.	506	25	1	X	—	—	X	Initial wound req. splenec., colostomy, and thoracotomy.
2	Frac. tibia; mult. wds. face +extrem.	726	25	1	—	—	—	—	Initial wound req. enucleation eye
3	Amp. thigh; mult. wds. extrem.	462	18	1	—	X	X	X	
4	Wd. leg; concussion	286	21	1	X	—	—	—	
5	Frac. fem. bilat.	209	24	1	X	—	—	X	
6	Severed fem. art. +vein; mult. wds. extrem.	88	41	3	—	X	X	—	Sec. lig. prof. art. +fem. vein; sympath. 14 days before test.
7	Penet. abd.; frac. fem. mult. wds. extrem.	1220	27	1	—	—	—	—	
8	Avulsion legs.	902	24	1	—	—	—	X	
9	Amp. thigh bilat; mult. wds. extrem.	209	20	1	—	X	—	—	
10	Frac. fem. +tibia; mult. wds. extrem.	682	26	1	X	X	X	X	Initial wds. complic. by renal "crush syndrome." Transient.
11	Avulsions extrem.	445	15	1	—	—	—	X	
12	Frac. tibia (knee); mult. wds. extrem.	242	20	—	—	X	X	X	RBC 2.03 million Hgb. 6.5 gm.
13	Frac. tibia; mult. wds. face +extrem.	440	19	1	X	X	X	X	
14	Penet. chest +abd.; mult. wds. extrem.	286	60	3	—	X	X	X	Initial wd. req. colostomy; dev. subphren. +pelvic abscess.
15	Amp. arm; mult. wds. all extrem.	451	20	1	X	X	—	X	
16	Frac. ankle; mult. wds. trunk, face, extrem.	220	10	—	—	—	—	—	
17	Penet. chest; frac. scap., sp. process D-3.	396	26	1	X	—	—	—	
18	Frac. fem.; mult. wds. ext.	440	20	—	—	—	—	—	
19	Penet. abd.; mult. wds. extrem.	198	26	2	X	X	X	X	Lac. liver; tibial artery ligated, initial wound.
20	Mult. wds. all extrem.	495	20	—	—	—	—	—	
21	Amp. thigh	286	22	1	—	—	X	X	
22	Mult. frac. foot	550	10	—	—	X	—	—	
23	Mult. frac.; Mult. wds. ext.	308	13	1	X	X	X	X	Profunda fem. art. ligated 3 days before test.
24	Mult. wds. extrem.	462	12	—	—	—	—	X	Retained metal fragment knee joint.
25	Mult. wds. ext. concussion.	484	19	—	—	—	—	—	
26	Penet. chest; mult. wds. extrem. +trunk.	242	43	2	—	—	X	X	Biliary fistula, req. decortication, repair liver +diaphragm, 16 days before test.

and the eosinophil response. In 17 patients, 68% of the entire group showing a poor response, large open wounds were present at the time of the test. In only two of these was the initial eosinophil count below 250. In the satisfactory group, 11 patients, 42%, had open wounds. Four of these had low initial counts.

PRESENCE OF INFECTION

There was gross infection, either local or systemic, as detectable by leukocytosis, in 19 patients. Nine of these had unsatisfactory Thorn test, none of whom had an initial eosinophil count below 250. Of the 10 patients in this group showing satisfactory response, 4 had low counts. In a small series,

this seems to indicate that eosinophilia, in the presence of significant infection, suggests the possibility of adrenocortical exhaustion.

Presence of Anemia

There was no evident correlation between anemia and eosinophil response, although one of the 2 most severely anemic patients of the entire series was one of 4 in whom there was less than a 20% fall in eosinophils as a result of the test. This man (No. 13, Table I) had no infection, no open wounds. The test was performed 13 days following a hand grenade wound, which resulted in bilateral comminuted tibial fractures. This, being a relatively short interval insofar as this series is concerned, might explain the low count (220) and poor response to the test. By usual concepts, however, it is a long interval for the manifestation of stress, without significant complication.

The most severely anemic patient in the series (No. 12, Table II) showed a good response after initial count of 242, 20 days following compound tibial fracture involving the knee joint. This man also had several open, infected wounds. Nine additional patients in the unsatisfactory group, and 14 in the satisfactory group, had mild to moderate secondary anemia at the time of the test.

Repeated Tests

Tests were repeated in 10 patients who showed a poor response to the initial test, after an interval of 10-25 days. In 8 of these patients the initial eosinophil count was in excess of 250. Only two patients showed a normal response to the second test, 12 and 15 days, respectively, following the initial test. A third patient, in whom tests were performed at intervals of 21 and 13 days after initial test 21 days following injury, showed a normal response to the third test. Eosinophil response had decreased from 34% at the first test, to 22% at the second, despite apparent clinical improvement. In each of these 3 patients showing an eventual normal response, the eosinophil counts were well over 300 at each test.

Three additional patients showed considerable improvement in response to the second test, but did not attain the maximal 50% decrease. The counts remained above 250 in each case.

In the 4 remaining patients the response decreased by 10-31% at the second test. In 3 of the 4 a significant change occurred in the initial count, rising in two patients from 176 and 187, to 396 and 506, with diminished response of 10 and 11% respectively, and in a third patient, falling to 150 from a previous 374. It was this patient (No. 12, Table I) in whom the alarming diminution of response occurred, decreasing from a 36% fall at the first test, to only 5% at the second, 14 days later. The initial test was performed 21 days following an extensive abdominal wound, necessitating resection of a segment of ileum, repair of lacerated bladder, cecostomy and cystostomy. Convalescence was complicated by sepsis and anemia, and, 4 days following the initial test, laparotomy was required for lysis of adhesions producing intestinal obstruction. A third test, performed 11 days following the second, showed an initial count of 99, and a fall of 33% in response to ACTH. At this time the patient was considerably improved, with no anemia, and little detectable infection.

There was no clear explanation for the further diminished response to repeat tests in the three remaining patients of this particular group, each of whom appeared to be clinically improved. It is possible that the percentage spread, which did not exceed 11 in any of the three, was within the range of error. By no means, however did the cortical response, as represented by the test, keep pace with the clinical improvement of these three patients.

Case Report

The one patient to whom substitution therapy was given, in the form of *Cortisone Acetate*, is considered of sufficient interest to warrant description.

T.G.B. (No. 2, Table I), a 20 yr. old marine PFC, was injured by fragments from a hand grenade booby trap on May 3, 1953, suf-

fering a compound fracture, right femur, severed femoral artery, and multiple flesh wounds. Mid-thigh amputation was done, with ligation of the artery at the groin. Acute renal failure developed four days following the injury, necessitating dialization by "artificial kidney" at an Army evacuation hospital on three occasions within 8 days. Following resumption of renal function, the presence of a septicemia due to proteus organisms was detected, and found unresponsive to all available forms of chemotherapy and antibiotics.

The patient was transferred to this hospital on June 3, 1953. There were clean open wounds of amputation stump, a large through and through wound of the adductor mass, and a large groin wound, the site of artery ligation. The left leg was edematous and tender, with multiple small open wounds. There was a marked septic fever pattern, spiking to 106 degrees. There was polyuria, with sp. g. not exceeding 1.006, urine microscopically normal. Positive cultures *Proteus morgagni* were obtained from blood and urine, proving insensitive to all antibiotics *in vitro*, and showing no clinical response to mixed antibiotics, including polymyxin B. Hemograms revealed marked anemia, despite repeated transfusions of whole blood (40 units in 6 weeks).

Roentgenograms revealed sustained elevation of right hemidiaphragm. This, associated with tenderness of right upper abdomen and moderate distension, led to surgical exploration of abdomen, pelvis, and subphrenic spaces, on June 12, 1953, in attempt to discover and drain an abscess. Following this fruitless procedure, the patient's clinical condition continued to deteriorate. Hyperthermia continued unabated, the patient became irrational, with slight epileptiform seizures of upper extremities. Lumbar punctures, electroencephalograms, and other procedures designed to detect possible brain abscess, were negative. There was no evidence of endocarditis on repeated examinations, including cardiograms.

Hemogram on June 19, 1953, revealed 3.63 million RBC, 12,700 WBC with slight shift to left. Total eosinophil count was 396/cu. mm. Despite the presence of a generalized infectious process, *Cortisone Acetate* was administered in 25 mgm. doses, beginning at 12 hour intervals, then increasing to 6 hour intervals, so that a total dose of 350 mgm. was given during a 96 hour period. Eosinophil counts decreased rapidly, reaching 100/cu. mm. on the second day, and 66/cu. mm. on the fourth, and last day of treatment.

There was remarkable clinical improvement, noticeable by the second day of therapy. The patient became rational, epiliptiform seizures ceased, and appetite increased. On June 26, 1953, 48 hours after cessation of cortisone therapy, an abscess appeared deep to the left *Gluteus Maximus*, and was immediately drained, revealing pure cultures of *Proteus morgagni*. Two days following drainage of the abscess, the patient was afebrile, and remained so during the remainder of his hospitalization. Proteus organisms no longer appeared in blood cultures, but continued to grow from urine samples, and a resistant strain of *Hemolytic Staphylococcus aureus*, apparently previously masked by the proteus organisms, appeared in blood cultures.

Upon consultation with the cardiovascular service, a heroic schedule of penicillin therapy was begun, despite continued *in vitro* resistance to the highest concentrations of this antibiotic by both infecting organisms. Twelve million units of aqueous penicillin were administered daily, in divided intramuscular doses at intervals of two hours, for a period of 6 weeks. This therapy was well tolerated, the patient continuing to improve daily in every respect. All wounds healed by second intention, edema and tenderness disappeared from the left leg, and ambulation was begun, first by wheel chair, shortly thereafter by crutches. There was rapid regain of weight, strength, and general morale. Blood and urine cultures became sterile shortly following institution of massive penicillin therapy, and continued so during the remainder of hospitalization at this facility.

A Thorn test was performed on July 31,

1953, 88 days following initial injury. The eosinophil count was 352, but surprisingly, there was only a 10% fall in the response to ACTH, despite the remarkable clinical improvement. It is hardly conceivable that the relatively small dosage of cortisone administered 6 weeks previously could have rendered the adrenal cortex refractory for such an interval. The patient was evacuated to the United States by hospital ship before the Thorn test could be repeated.

A most interesting feature of this case was the localization of a proteus abscess concomitantly with the administration of cortisone, after 6 weeks of generalized blood stream infection. Present concepts are that cortisone should prevent such localization. Abscess formation at this particular time was quite likely coincidental. However, considerable improvement in the patient's general condition had been noted several days prior to the discovery and evacuation of the abscess, suggesting that the vital physiological processes, bolstered by cortical substitution therapy, were enabled to control the infection, which, prior to such therapy, had assumed overwhelming proportions.

A second point of interest was the apparent control of a *Hemolytic Staphylococcus aureus* septicemia and a persistent *Proteus morgagni* urinary infection with prolonged massive dosage of penicillin, despite the resistance of these organisms to the highest possible concentrations of penicillin, and other antibiotics, *in vitro*. Of course, as in all such studies conducted in overseas military facilities, follow-up evaluation is quite difficult to attain, and the possibility of eventual reappearance of these organisms in cultures of blood and urine is acknowledged. The patient was transferred from this hospital only 3 days following completion of the six week penicillin course, at which time cultures of blood and urine were sterile.

Summary and Conclusions

In summary, we have reviewed the records of 51 patients severely wounded in battle upon whom at least one 4 hour ACTH test was performed, at intervals of 9-88 days following injury. The wounds were multiple and complex, including compound fractures, major amputations, penetration of chest and abdomen, and extensive avulsion of soft tissues.

Twenty-five of the patients, 49%, showed an unsatisfactory response, in that less than a 50% decrease in circulating eosinophils occurred after stimulation of the adrenal cortex by ACTH. Eosinophilic response was correlated, in both the satisfactory and unsatisfactory group, with several factors, including the presence of eosinophilia and eosinopenia, type of injury, interval since injury, intercurrent operations, especially major procedures performed within one week of the test, the presence of large open wounds, and complications, such as infection and anemia.

The indications for substitution therapy, and response to this therapy, administered in the form of *Cortisone Acetate*, in a single patient, was discussed.

On the basis of this study, several conclusions seem to be in order:

1) War wounds, by their severity and complexity, are capable of exerting severe stress, resulting in adrenocortical hyperactivity for prolonged intervals, and ultimately producing a refractory cortical state in a significant percentage of patients.

2) Wounds resulting in major fracture or amputation, and perforating wounds of the body cavities, are more likely to produce adrenal stress than are less complex wounds.

3) The multiple surgical procedures frequently required in the management of war wounds, tend to prolong and increase adrenal stress, unless the cortex has sufficiently recovered its integrity prior to the performance of such procedures.

4) Adrenal stress may be prolonged by the presence of large open wounds and infection, especially in combination. There is less stress associated with uncomplicated secondary anemia.

5) In general, the presence of decreased numbers of eosinophils in the circulating blood of the severely injured patient signifies continued adrenal stress, frequently with

preserved cortical integrity. An eosinophilia in the presence of infection, or other complication, suggests exhaustion of cortical reserve, which should be verified by Thorn test, or other suitable procedure. In the presence of a deteriorating clinical status, a poor response should indicate consideration of substitution therapy.

6) There is rather poor correlation, in some instances, between the apparent adrenal status, as reflected by the eosinophil response, and the clinical condition of the patient, especially in the group showing unsatisfactory response. This was more noticeable in the present study than is usually described by those investigating other types of stress. As in other studies, there is more accurate correlation between eosinophilic response and apparent clinical status in those patients who show a normal reaction to the ACTH test. It is suggested that the unmeasurable factor of emotional stress may have a prominent role in the overall effect of war wounds on adrenocortical integrity.

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Pharmacologic Aspects of Hypertension*

By

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(With five figures)

THE current medical management of arterial hypertension involves the use of drugs which differ in potency and mechanism of action. The proper use of these agents in the control of hypertension requires a firm knowledge of their pharmacological effects following administration to man. Before discussing some recent observations with antihypertensive agents currently under study by the National Heart Institute at the Clinical Center, the pharmacological properties of four widely used antihypertensive agents will be reviewed.

The methonium compounds as represented by hexamethonium and pentapyrrolidinium constitute the most potent agents currently available for the management of severe arterial hypertension. These compounds lower blood pressure by virtue of their ability to produce blockade of autonomic ganglia through direct competition with acetylcholine at this site.[1] It should be emphasized that the autonomic blockade is indiscriminate and the ensuing fall of blood pressure is but a single aspect of the drug action.

The hemodynamic effects resulting from the administration of these agents are shown in the first column of Table I. As shown, there is a lowering of cardiac output; peripheral resistance is decreased; there is no remarkable change in cerebral blood flow; renal blood flow decreases and there is usually a slight increase in the heart rate. It should be noted that the diminution in renal blood flow is accompanied by a diminished glomerular filtration rate but there is a gradual return to normal levels on continued administration of the drug. The effect on the blood pressure is most pronounced in the upright position; lowering of recumbent pressure is less significant.

These compounds are erratically absorbed from the gastrointestinal tract. Only 5 to 10 per cent of an oral dose of hexamethonium is absorbed and slightly more, up to 20 per cent, of an oral dose of pentapyrrolidinium. Seventy to 80 per cent of an ingested dose of hexamethonium can be recovered in the urine and stool, and following intravenous administration, approximately 90 per cent of the drug can be recovered from the urine in a 24-hour period.[1] It is unlikely that the drug undergoes any important metabolic transformation in the body and, of course, the principle route of excretion is through the kidney. This dependence upon renal excretion severely limits the usefulness of these compounds in the treatment of hypertension associated with severe renal damage since the effects may be potentiated.

TABLE I

HEMODYNAMIC EFFECTS OF ANTIHYPERTENSIVE AGENTS

	Methoniums	Hydralazine	Veratrum	Reserpine
Cardiac output	DEC	INC	INC-DEC	N.C.
Peripheral resistance	DEC	DEC	DEC	DEC
Renal blood flow	DEC	INC	DEC	N.C.
Cerebral blood flow	N.C.	N.C.	N.C.	?
Heart rate	N.C.-INC	INC	DEC	DEC

The early phase of administration of these drugs may be characterized by the fact that increasingly larger increments of the drug are necessary to produce lowering of the

* Presented at the Medical Section Panel Meeting, 61st Annual Convention of the Association of Military Surgeons of the United States, Hotel Statler, Washington, D.C., November 29-December 1, 1954.

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blood pressure. This is not due to any increase in rate of excretion or to the development of a detoxicating mechanism. Fortunately, tolerance can often be interrupted by discontinuing the drug for a few days and maintenance doses can be re-established.

The indiscriminate nature of the autonomic blockade, the erratic and unpredictable absorption from the gastrointestinal tract, the dependence upon renal excretion, and the development of tolerance are pharmacologic properties of these compounds which limit their clinical usefulness in the treatment of hypertension. It is obvious that therapy with these drugs requires considerable care on the part of the physician and reasonable intelligence on the part of the patient.

Hydrazinophthalizine is a rather unique antihypertensive agent, the mechanism of action of which is poorly understood. Although the drug weakly antagonizes the vasoconstrictor effect of pressor amines such as epinephrine and nor-epinephrine, it cannot be classed as a true adrenergic blocking agent. Some investigators feel its primary site of action is on the central nervous system to suppress sympathetic vasopressor outflow.[2] Recent evidence, however, points to a direct action on the blood vessels to produce vasodilation primarily in the splanchnic circulation.[3] Experimental data are most consistent with the latter explanation.

Following administration there are some rather remarkable effects on cardiovascular dynamics as shown in the table. There is a striking rise in heart rate and cardiac output, marked decrease in peripheral resistance, no change in the cerebral blood flow and an increase in renal blood flow. The increase in renal blood flow which occurs is desirable in the therapy of hypertensive vascular disease, but it should be noted that the increase in renal blood flow is not paralleled by a corresponding increase of glomerular filtration rate and the excretion of non-protein nitrogen is not enhanced.[4]

The drug is rapidly absorbed from the gastrointestinal tract. Traces of the drug can be found in the urine 30 minutes after oral ingestion. There is little information concerning its metabolic fate in the body and Perry[5] has shown that only 5 per cent of the drug can be recovered from the urine indicating that it is largely metabolized.

The veratrum alkaloids produce their hypotensive effects by reflex action through the stimulation of receptors located in the heart, lungs, and carotid sinus areas. The reflex response is characterized by lowering of the blood pressure, depression of respiration and bradycardia.[6] The hemodynamic effects of veratrum or its purified derivatives are as shown in Table I. Investigators have reported conflicting data—some showing moderate increases in cardiac output and others a decrease. Peripheral resistance is decreased as is the heart rate and renal blood flow. Cerebral blood flow is little changed.

The veratrum compounds are effective in milligram doses. There is a marked discrepancy between the effective dose parenterally and that given orally, indicating that the drug is poorly absorbed from the gastrointestinal tract. There is no data on its metabolic fate within the body. One of the unfortunate side effects of the veratrum alkaloids is the occurrence of nausea and vomiting. This is dependent, apparently, upon stimulation of the nodose ganglion and is intimately related to the reflex pathways which initiate the hypotensive response.

A fourth group of antihypertensive agents are those obtained from the roots of Rauwolfia serpentina. Again we are dealing with compounds with an incompletely understood mechanism of action. Recent pharmacological investigations indicate that the primary site of action is in the hypothalmus with a diminution in vasomotor tone and lowering of the blood pressure.[7] The hemodynamic effects of the administration of these compounds, although not completely studied to the present time, are shown in Table I. The heart rate is characteristically slowed and peripheral resistance is decreased. The cardiac output and renal blood flow are not changed. Cerebral blood flow has not been evaluated.

The pure substance, Reserpine, is fairly well absorbed from the gastrointestinal tract and is, of course, effective in milligram doses or less. There is no available data concerning its intermediary metabolism or its mode of excretion. Clinical pharmacologic data are incomplete. Some current studies in our laboratories at the Heart Institute conducted by Doctor Haverback indicate that Reserpine has effects upon the motility and secretions of the gastrointestinal tract which may affect its clinical usefulness.[8]

In summary, it is fair to say that, at present, the ideal antihypertensive agent is not at hand and the compounds discussed above, which are widely used currently, leave much to be desired. Although potent drugs are available which can control hypertension they require critical attention to dosage and extreme care in their administration.

In our clinic we have been interested in several antihypertensive drugs, one of which has been introduced in this country primarily as an anti-emetic drug. We became interested in chlorpromazine several months ago when some preliminary reports indicated that it had a marked effect upon blood pressure in an occasional patient. Subsequently we evaluated the effects of intramuscular chlorpromazine on the blood pressure of ten hypertensive patients and found that with the dosage used, a consistent postural fall in the blood pressure was demonstrable.[9] The characteristic response of the blood pressure following intramuscular chlorpromazine is shown in Figure 1. It will be noted that a demonstrable effect was present within 15 minutes following the injection. The maximum response occurred in approximately three to four hours and persisted for six hours. There was no remarkable change in the recumbent pressure. Moran has studied the action of chlorpromazine in dogs and found evidence of adrenolytic effects but the postural lowering of blood pressure is due primarily to central nervous system action.[10] There was no apparent ganglionic blockade and the postural change occurred prior to any marked evidence of epinephrine block-

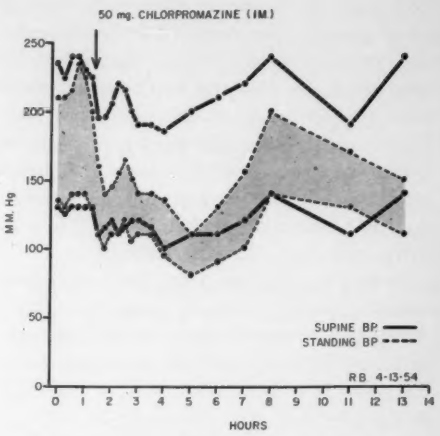

FIG. 1. Action of Chlorpromazine on blood pressure. Note fall in systolic and diastolic pressure while standing without change in recumbent pressure.

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ade. It would, of course, be absurd to do any more than to speculate on the possible efficacy of this drug in the management of arterial hypertension, but there are certain theoretical implications which are currently under study.

Another drug which we have been extremely interested in from the clinical standpoint is a non-alkaloidal substance obtained from the leaves of the Rhododendrun maximum, known as andromedotoxin. It has been known for many years that the leaves of the mountain laurel contained a substance or substances which have certain profound hemodynamic effects in animals. Andromedotoxin was isolated in pure form from the leaves of Rhododendrun maximum in the course of a drug-screening program. It is nitrogen free but its exact chemical configuration is not known at present.

Moran studied andromedotoxin in animals and found, in general, that it was similar to the veratrum alkaloids in producing the characteristic response, i.e., respiratory depression, hypotension and bradycardia.[11] A characteristic reaction to the intravenous administration of this compound in dogs is shown

in Figure 2. As shown there is a drop in blood pressure accompanied by bradycardia and respiratory depression. Tachyphylaxis does not occur. Postural hypotension occurs with the lowering of the blood pressure. Emesis occurred in unanesthetized dogs upon parenteral administration in doses of 7 micrograms per kilogram and greater. This emetic dose is comparable to that obtained in animals with crude veratrum alkaloids.

With the evidence from animal experiments of antihypertensive properties, an investigation of the effects of andromedotoxin in human hypertension was instituted. Since the possibility of a marked species difference in the effects of this compound existed, extremely small doses of the drug were given initially by intravenous infusion. As the intravenous dose was gradually increased we soon became relatively convinced that we were dealing with a completely inactive compound; however, our first experience with its pharmacologic action was rather dramatic. In Figure 3 is charted the blood pressure response to andromedotoxin of an individual to whom an intravenous infusion of 2 gammas per kilogram per minute had been given for 10 minutes followed by an increase in

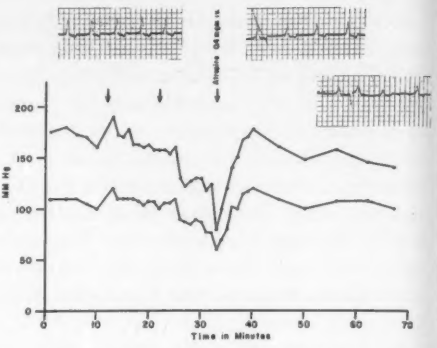

FIG. 3. Intermittent intravenous infusion of andromedotoxin. For explanation see text.

the dose to 4 gammas per kilogram per minute. As will be noted, after a period of approximately 5 minutes of the higher dosage, there was a striking reduction in the blood pressure attended by nausea and vomiting and, as shown in the figure, alterations in the electrocardiogram. The administration of atropine resulted in a very prompt restoration of the blood pressure towards its basal level; the electrocardiogram became normal and there was an increase in the heart rate. Further infusions were carried out with a

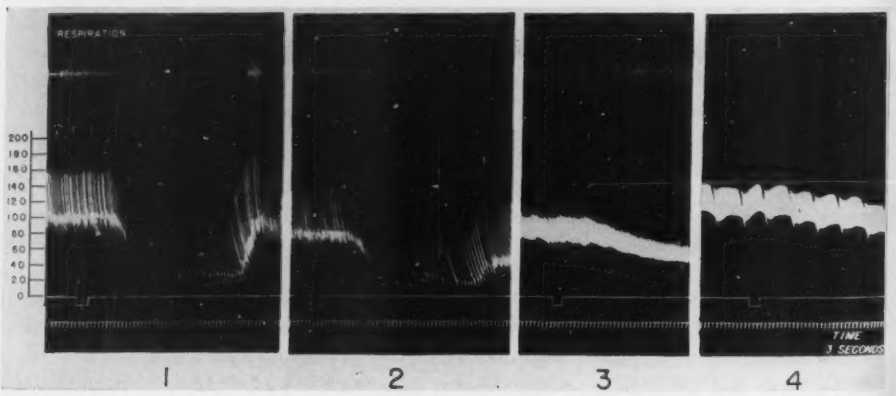

FIG. 2. The circulatory and respiratory reflex effects in a dog anesthetized with chloralose; given Andromedotoxin 3 microgm./kgm. I.V. at each number. No. 1 and 2 are the first and seventh of seven successive injections 8 minutes apart showing no tachyphylaxis. Between 2 and 3 atropine 1.0 mgm./kgm. was given. Between 3 and 4 cervical vagotomy was performed.

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dosage of 2 gammas per kilogram per minute and demonstrated that andromedotoxin was capable of producing a hypotensive effect in man. With this dose, however, nausea and vomiting invariably occurred.

In order to further evaluate andromedotoxin it seemed worthwhile to compare and contrast it with the purified veratrum alkaloid, protoveratrine. Krayer and Meilman have studied protoveratrine extensively and a characteristic dose response relation has been worked out.[12] It has been shown that the administration of protoveratrine in a dose of 3 gammas per minute results in lowering of the blood pressure within one hour and that it was possible to maintain the blood pressure at a reduced level with a rate of infusion of approximately 1 gamma per minute. A series of andromedotoxin infusions were given beginning with a dose of 1 gamma per minute for four hours. The dose was gradually increased and no response occurred until levels of 50 gammas per minute were given. Even at this dose the response did not occur for two or sometimes three hours after the infusion was started. When the dose necessary to produce an effect was calculated on a gamma per kilogram basis, it was found that 1 gamma per kilogram per minute produced a characteristic response within 60 minutes. The response at this dosage level is shown in Figure 5. It was obvious from this data that andromedotoxin on intravenous infusion was approximately 15 to 30 times less potent than protoveratrine in producing a hypotensive response.

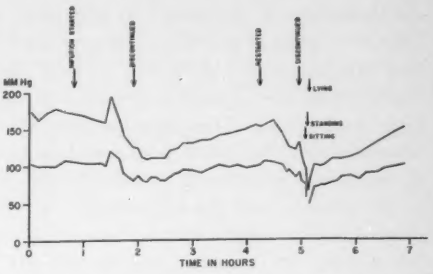

FIG. 5. Andromedotoxin infusion. First arrow indicates beginning of infusion at rate of 2 gammas per kilogram per minute—increased to 4 gammas per kilogram per minute at second arrow. Infusion discontinued when atropine given—EKG shown changes during infusion. Lower right tracing at height of hypotensive response. Short P-R and prolonged QRS was present prior to infusion.

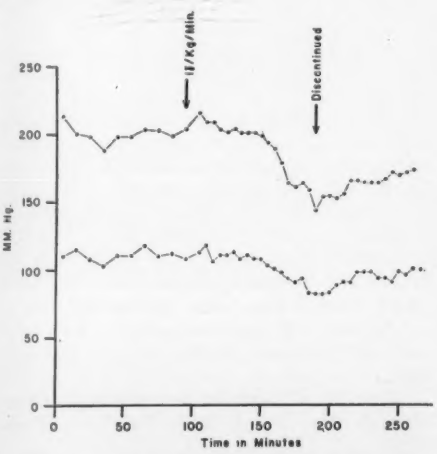

FIG. 4. Lowering of blood pressure following infusion of andromedotoxin at rate of 1 gamma per kilogram per minute.

Having established a dosage of the drug which was capable of eliciting reflex lowering of the blood pressure, an attempt was made to establish an intravenous maintenance dose. Unfortunately, it was impossible to do so because of the extremely narrow range between an ineffective and toxic dose. After producing an initial drop in blood pressure, attempts to maintain the blood pressure with 0.3 gammas per kilogram per minute resulted in the blood pressure gradually returning to control levels and with 0.4 gammas per kilogram there was further lowering of the blood pressure.

The data clearly indicate that it is not practical or possible to give continuous infusions of andromedotoxin in an attempt to control the blood pressure. This is in contrast to protoveratrine which has been given continuously for as long as 96 hours. As an alternative, the use of intermittent infusions

was investigated. As shown in Figure 5, a dose of 1 gamma per kilogram per minute was administered and within 1 hour the characteristic hypotensive response occurred with bradycardia. The infusion was then discontinued. The blood pressure remained at this lower level for a period of from 60 to 90 minutes and then gradually rose to control levels approximately two to three hours after the infusion was discontinued. The infusion was restarted at the same dosage level and the hypotensive response again ensued. The response usually occurs after a shorter period of infusion than that with the initial infusion indicating a residual effect from the previous dose. Although a postural effect on blood pressure is not a regular feature following the veratrum compounds it has been demonstrated following andromedotoxin. The postural decline in blood pressure is also shown in Figure 5. This has been demonstrated repeatedly.

In general, the side effects noted with the administration of andromedotoxin were similar to those following the administration of the veratrum alkaloids or protoveratrine, i.e., nausea, vomiting and electrocardiographic changes. A consistent response with the intravenous infusion of andromedotoxin is the occurrence of paresthesias of the nose and lips followed by sneezing. This was a quite striking feature and invariably preceded the onset of a hypotensive effect and gave some objective evidence of the impending change in the blood pressure. There was a very low incidence of nausea and vomiting following the administration of andromedotoxin in the dosage range employed in these infusions.

Andromedotoxin has been administered by a rapid intravenous infusion to a group of patients in a dose range of 0.5 to 1.5 milligrams in a period of 2 minutes without producing any demonstrable effects. It is quite obvious that there is a discrepancy between the effective intravenous doses of andromedotoxin and protoveratrine. At present, we do not have any objective information concerning the usefulness of andromedotoxin by the oral route. Animal studies indicate that it is somewhat inactivated by gastric acid and, hence, its possible value may depend on whether a suitable enteric capsule can be manufactured.

Summary

The pharmacologic properties of four widely used antihypertensive agents and the clinical results of parenteral administration of chlorpromazine to hypertensive patients are briefly presented.

Andromedotoxin, a crystalline substance obtained from the leaves of Rhododendron maximum with actions similar to veratrum in animals, has been evaluated in human hypertensives. Lowering of the blood pressure was produced following intravenous infusion of 1 gamma per kilogram per minute. A maintenance dose could not be established. Postural hypotension was a feature of the lowering of the blood pressure; nausea, vomiting, electrocardiographic changes were noted as side effects. Paresthesias of the face and lips with sneezing invariably accompanied intravenous infusion.

Further investigation with andromedotoxin will be required to define its possible role in the treatment of arterial hypertension.

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REAR ADMIRAL BARTHOLOMEW W. HOGAN, MC, USN (left), Surgeon General of the Navy, unveils a bronze roster of Surgeons General in the lobby of the Bureau of Medicine and Surgery. Witnessing the unveiling (left to right) are Rear Admirals Bruce E. Bradley, Deputy Surgeon General; Thomas F. Cooper, Assistant Chief for Planning and Logistics; and Irwin L. V. Norman, Assistant Chief for Personnel and Professional Operations.

The Sigmoidoscopic Appearance of the Intestine in Health and Disease

By

COLONEL RYLE A. RADKE, MC, USA*

THE examinations upon which the descriptions to follow are based were all performed with distal lighting sigmoidoscopes, 2 cm. in diameter and 24 cm. long, with a single tap water enema as preparation. In most instances, the technique employed has been to introduce the sigmoidoscope 4 cm., remove the obturator, and then advance under direct vision to its fullest extent rather rapidly and examine the intestine in detail as the instrument is withdrawn. When lesions have been visualized, material from them has been obtained by aspiration with a 1 ml. serological pipette and subjected to cultural and microscopial examination for protozoa and bacteriological examination for enteric pathogens. When mucus and fecal debris have obscured the view of the mucosa, it has been removed by aspiration through an open-ended woven catheter.

APPEARANCE OF THE NORMAL INTESTINE

The normal rectal mucosa (Fig. 1) is smooth, moist, pale pink in color, with the vascular pattern clearly visible beneath it. It adheres closely to the underlying intestine and readily distends away from the instrument with the rush of air that accompanies removal of the obturator. The three valves of Houston are seen to project into the lumen and to have a wrinkle in their lumenal edge. The rectosigmoidal junction (Fig 2) is seen to have a sphincter-like appearance, opening and closing in many patients in a manner similar to that of the pylorus seen through the gastroscope. The sigmoidal mucosa is normally slightly pinker than that of the rectum, and folds are seen running transversely to the long axis of the bowel. The sigmoid colon is less distensible than the rectum, and the vascular pattern is frequently not visible through the mucosa.

Normal Variations. Occasionally the mucosa is observed to be of different color, in some instances of yellowish hue, in others, quite white, particularly when the patient is anemic or has been taking chloroquine. Frequently observed is excessive dryness of the mucosa. That this may be associated in some instances with apprehension over the examination is suggested by its occasionally observed disappearance during examination. Dry intestines are often seen to be coated with flakes of dry stool even though the enema has resulted in evacuation of the main bolus. When sigmoidoscopy is performed within 48 hours of barium enema, the intestine is usually dry; and flecks of barium are to be seen adherent to the mucosa. Excessive mucus secretion is sometimes observed—this appears to be a normal variation. In some cases where this is present, stroking the intestine with the instrument will result in the outpouring of a large glob of mucus. Occasionally encountered in obese people is a condition in which the intestine is difficult to inflate away from the instrument. This is due to the pelvic fat deposits but must be distinguished by the normal mucosa and submucosal vascular pattern from intestinal edema such as is seen in shigellosis.

Emotional Intestinal Changes. Diastolic red is a term which we have applied to the characteristic bright red color of the intestine

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The author is indebted to Burroughs Wellcome & Co. (U.S.A.) Inc. for a grant to make possible the publication of this article.

SFC Kay Ihara, Medical Illustration Section, 406 Medical General Laboratory, and Mr. William R. Hommel, Medical Illustration Section Laboratory, Fitzsimons Army Hospital, assisted materially in preparation of the color illustrations.

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associated with elevation of the diastolic blood pressure. We have checked the diastolic pressures of many patients who exhibited this phenomenon and have found uniformly an elevation of the diastolic blood pressure above normal for the patient concerned. In some patients whose elevation of diastolic blood pressure was momentary in duration, the coloration has been observed to fade rapidly during examination. This "blush" obscures partially the normal vascular pattern.

Emotional blotches, bright red spots beneath a normal mucosa, 1 to 3 cm. in diameter, have been observed diffusely throughout the rectum in some patients whose reactions during examination suggested that they were under emotional tension. In two instances, these intestinal blotches were observed in migrainous patients who had been observed to have similar blotches over the collar area and upper thorax when under emotional strain. These have been observed to disappear during examination and are believed to be associated with apprehension over the examination in some instances. In several cases, they have been observed to reappear when some remark of the operator occasioned alarm.

Antibiotic red is slightly present in any patient who has been taking broad spectrum antibiotics for several days prior to the examination. The surface of the mucosa is roughened, and the redness is more intense than that seen in the emotional states and does not disappear under observation. This is thought to represent inflammation and irritation resulting from disturbance of the normal intestinal flora and is perhaps an early manifestation of the process which results in pseudomembranous enterocolitis in some unfortunate patients. The redness and roughening of the intestinal mucosa have been observed to persist a number of days after the medication has been discontinued.

Diffuse granularity is sometimes observed and is believed to be a normal variation. In an intestine with this phenomenon, slight increase in the red color is observed, sometimes patchy; the intestine is more easily traumatized than normal; and the mucosa is seen to present a finely granular appearance. It is my belief that this represents the result of prolongation of the emotional redness previously described. We have also observed this in the course of healing shigellosis.

Appearance of the Diseased Intestine

Factitious Proctitis. The most frequently encountered deviation from normal is traumatic proctitis from the enema tip and sigmoidoscope. Trauma from the enema tip and obturator is seen on the anterior wall of the rectum starting just above the pectinate line and extending to the right lateral wall at three o'clock where it is seen to run to the edge of the lower valve of Houston. Obturator trauma is rarely seen at this level if the instrument is employed properly. Enema tips that have been introduced further then traumatize the middle valve of Houston on the left lateral wall at nine o'clock; and in occasional cases, traumatic lesions are seen at the rectosigmoidal junction at about 11 o'clock.

The appearance of these lesions is characteristic (Fig. 3). Inevitably, there is seen normal mucosa running to the very edge of the usually multiple lesions which are linear to the long axis of the bowel and vary in depth, being shallow at the caudad end and deeper in the cephalad end. The freshness of the lesion is impressive; although clotted blood is seen in them, it is unchanged. Sometimes seen is an abrasion of the rectum just above the anal canal, which is similar in appearance to that of the skin which has been scraped along the pavement or athletic mat (mat burn). This lesion is made up of a number of small millimeter to 2 mm.-sized petechial ulcers filled with clotted blood; ordinarily also to be seen are shallow scratches linear to the long axis of the bowel which give a lead to the true nature of these lesions which are difficult to distinguish from miliary abscesses of amebiasis.

More extensive factitious proctitis (Fig.

4) is encountered in patients who have introduced foreign material into the rectum—illustrated is such a case with extensive edema, ecchymoses and inflammation of the mucosa to a height of 10 cm. The true nature of the process was established when linear scratches were seen near the margins of the inflamed area. Similar factitious proctitis is produced by rectal instillation of irritating substances such as paraldehyde or ether for therapeutic reasons. A mild degree of diffuse proctitis is seen when saline purge and soap suds or similar irritant enema has been used in preparation for sigmoidoscopy.

Diffuse Proctitis of Unknown Etiology. Diffuse granularity of the intestine associated with dulling of the mucosa, obscuration of the vascular pattern and some edema of the mucosa is observed not infrequently. This phenomenon is often confined to the rectum and occasionally the lower part of that organ. This has been observed in some cases of chronic shigellosis; but in others no recognizable etiological agent has been secured. An occasional case of this nature has been found to harbor *Trichomonas hominis*, but the etiological connection of the flagellate is not clear cut. These lesions are occasionally discrete and patchy. When this occurs much difficulty is experienced in distinguishing them from the similar superficial erosions of amebiasis.

Amebiasis. Superficial Erosion. The earliest lesion of amebiasis is the superficial erosion (Fig. 5) which is ordinarily an edematous, circular area in which the mucosa is not intact and the normal submucosal vascular pattern is obscured. The surface of such an erosion is characteristically pitted with small areas in which the involvement is deeper seated. Superficial erosions may vary in size from 2 mm. in diameter to huge areas which extend many centimeters up the bowel. Invariably, amebic lesions are found surrounded by normal mucosa. These lesions are not characteristic of amebiasis but should arouse suspicion.

Miliary Abscess: The miliary abscess (Fig. 5), on the other hand, is quite characteristic of amebic infection and is a minute pinpoint to 1 to 2 mm.-sized reddish-brown raised area of the mucosa which may be ruptured and the contents aspirated by pisette suction, revealing a deep-seated and much larger involvement of the submucosal tissue. These lesions occur in constellations of two to six (or more), which, I believe, results from their formation within the confines of a preceding superficial erosion. Because I have been able to demonstrate the presence of *E. histolytica* in the vast majority of miliary abscesses, *it is my opinion that the miliary abscess is completely characteristic of amebiasis; and when it can be identified with certainty, the clinician may be assured that amebiasis is present in his patient.*

Ulcerations. Ulcerations of amebiasis are of two types: superficial and deep. The superficial ulcerations (Fig. 6) appear similar to the superficial erosions except that no mucosa is seen throughout the extent of the lesion. They vary in size from 0.5 to 3 or more cm. in diameter, usually are round or oval. The deep ulcerations (Fig. 7) of amebiasis are usually black-based; the edges of the ulceration are seen to overhang; and, in some instances, shreds of tissue are seen protruding from the base. This type of ulceration has been said to be characteristic of amebic infection. However, more important in identifying the amebic nature of the lesion than the character of the ulcer is the almost universal presence of miliary abscesses in the area surrounding the ulcer if they are searched for with patience and with due regard to their minuteness.

Ameboma. Not infrequently amebic ulcerations are seen in which piled up granulation tissue surrounds the periphery. When this granulation has become so exuberant as to obscure the presence of the ulceration (Fig. 8), the lesion may appear in every respect similar to a tumor. This has been termed ameboma. Its true character may be revealed only by biopsy.

Submucosal Pigment Spots. When healing occurs in amebic lesions which have been

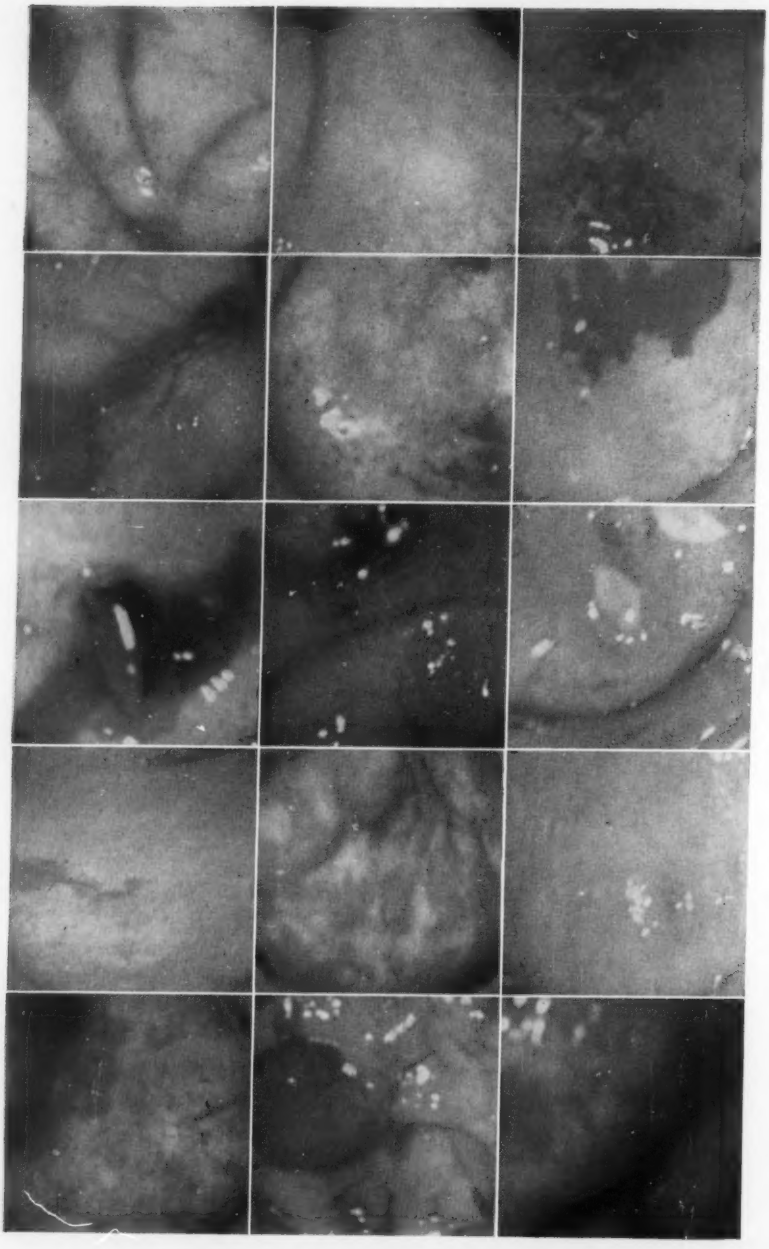

PLATE I

deep-seated, such as miliary abscesses or deep ulcerations, the mucosa heals very rapidly, leaving pigmented debris submucosally at the base of the ulcer or small bluish spots in the case of miliary abscesses (Fig. 9).

Scars. Some amebic lesions heal leaving deep-seated scars of variable size (Fig. 9). These may persist during continued observation and are occasionally so numerous as to give a pig skin-leather appearance to the intestine. Deep-seated scars, especially if they are pigmented, are strongly suggestive of amebic infection.

Shigellosis. The sigmoidoscopic appearance of the intestine in shigellosis (Figs. 10 and 11) is characteristic and consists in the presence of inflammation, edema, submucosal ecchymoses and the presence of follicular exudate which is seen as a small white elevation of the mucosa and which exudes purulent material when pressed. Ulceration (Fig. 10), when present, is very superficial. All degrees of severity of this basic appearance are encountered, and the lesions may be present in patches 4 to 5 cm. or more in diameter, surrounded by relatively normal mucosa. Coating the surface of these lesions is seen an exudate composed of mucus, pus, and blood. As healing occurs, the edema subsides (Fig. 12), the follicular exudates disappear, and a granular mucosa is seen with partially absorbed ecchymoses obscuring the normal vascular pattern. Occasionally to be seen are 2 to 3 mm.-sized retention cysts (Fig. 12) remaining after the entire process has subsided. When sigmoidoscopy is done early in the disease, edema, inflammation, and a coating of exudate may be the only evidence of the presence of the disease process. Identical appearance of the intestine is sometimes observed and bacteria of the paracolon group isolated. These are believed to be pathogenic.

First row

Fig. 1 (left)—Normal rectal mucosa. Note vascular pattern.

Fig. 2 (middle)—Rectosigmoidal junction mucosa. Note vascular pattern is less marked than in rectal mucosa.

Fig. 3 (right)—Factitious proctitis—due to trauma of enema tip.

Second row

Fig. 4 (left)—Factitious proctitis, severe. Note edema, linear scratches, inflammation, absent vascular pattern.

Fig. 5 (middle)—Amebiasis, rectal. Note miliary abscesses to left, superficial ulcer right bottom, edge of deep ulcer, right top, normal mucosa elsewhere.

Fig. 6 (right)—Amebiasis, rectal. Superficial ulceration.

Third row

Fig. 7 (left)—Amebiasis, rectal. Deep ulceration with slough.

Fig. 8 (middle)—Ameboma, rectal. Extensive granulation about a large, deep ulceration.

Fig. 9 (right)—Amebiasis, healing. Note 2 depressed scars, submucosal pigment spots.

Fourth row

Fig. 10 (left)—Shigellosis, acute. Note superficial ulceration absent vascular pattern due to edema.

Fig. 11 (middle)—Shigellosis, acute. Note edema, ecchymoses, follicular exudate, inflammation.

Fig. 12 (right)—Shigellosis, chronic. Note absent vascular pattern, follicular retention cyst.

Fifth row

Fig. 13 (left)—Thromboulcerative colitis, chronic. Note edema, petechial hemorrhages, superficial ulcerations.

Fig. 14 (middle)—Adenomatous polyp. *E. histolytica* recovered from ulceration on tip of tumor.

Fig. 15 (right)—Carcinoma of rectum. Note polypoid appearance and complete absence of vascular pattern.

In some cases of chronic shigellosis, superficial ulcerations are to be seen surrounded by normal mucosa. They vary in diameter from 2 to 10 mm., are remarkable for the paucity of inflammation in and about them, and appear as if they were produced by a sharp instrument. Occasionally to be observed in cases presenting this phenomenon are granularity, inflammation, and edema of the mucosa. This is frequently observed to involve the rectum just above the pectinate line and the lowermost sigmoid with normal-appearing mucosa elsewhere.

Thrombo-ulcerative Colitis. Thrombo-ulcerative colitis is believed to be a better term than chronic ulcerative colitis to refer to the ulcerative colitis of undetermined etiology which is associated with thrombotic lesions in the intestinal blood vessels. In early cases, the intestinal mucosa presents a diffuse, velvety granularity with obscuration of the vascular pattern, submucosal petechial hemorrhages, and widespread small, superficial ulcerations. More advanced cases (Fig. 13) present a loss of elasticity of the bowel wall; the valves of Houston and sigmoidal haustrations may be barely visible; and the intestine presents the appearance of a rigid tube with deep red, velvety interior exuding dark blood from every visible surface. Beneath this inflamed surface are small petechial hemorrhages, and the dark red color of the intestinal wall is seen to be due to widespread ecchymoses. Normal mucosa is not visible. Remissions may occur and leave the intestine entirely normal in appearance except for an easily traumatized mucosa. In some cases, islands of inflamed hypertrophied mucosa project into the lumen of the bowel, giving an appearance of polyps upon a broad base. It is generally conceded that these are not adenomatous polyps *per se*, and they have been termed pseudopolyps.

Schistosomiasis. Infestation with the human blood fluke results in the formation of papular and papulo-pustular lesions of the rectum which are 2 to 4 mm. in diameter and project into the intestinal lumen a similar length. Often visible is a yellow tip on the lesion similar to an acne pustule. Less clearly ascribable to schistosomiasis, but frequently seen in association with it, are small submucosal petechiae which are difficult to differentiate from the amebic miliary abscess when the petechiae are several days old at the time of examination and reaction is present around them.

Adenomatous Polyps. These tumors are seen in the rectum and sigmoid colon and range in size from 1 to 2 mm. broad-based tumors projecting 1 to 4 mm. into the lumen of the intestine to tumors 8 to 10 cm. in diameter on a long, slender pedicle (Fig. 14). They are ordinarily covered with normal-appearing mucosa, although inflammation and ulceration are occasionally present on the tip. The tumors are often multiple. This is especially true of the congenital variety; and, when multiple, they present wide variations in size. The polyp may sometimes be seen several cm. down the intestine from its site with considerable tension upon its pedicle and pulling the normal intestine with it. This must be considered when describing the location of a polyp and its removal, since, if the base is above the level to which the sigmoidoscope can be passed, removal by biopsy forcep is not safe.

Other polypoid tumors rarely are seen through the sigmoidoscope, such as leiomyomata, hemangiomata, and fibromata. Exact differentiation by examination of the gross tumor is impossible.

Carcinoma. Adenomatous polyps are considered to be precancerous lesions, and the most frequently encountered rectosigmoidal area cancer (Fig. 15) is polypoid in appearance with carcinomatous degeneration apparent in some area of the tumor. Often when the rectal cancer is so widespread and infiltrative as to practically surround the intestinal lumen, adenomatous polyps will be seen elsewhere in the intestine. Some cancers in this area develop as flat ulcerative lesions with peripheral spread. It has been suggested that these are the result of carcinomatous degeneration in the base of a polyp pedicle, the polyp having sloughed off.

Parasitic Infections Found Among Repatriated Personnel of the Korean Conflict

By

ADRIANO D. ALICNA*

(With one table)

KNOWLEDGE of intestinal parasitic diseases is of particular importance in the military service. The theater of war in World War II and the Korean Conflict was in areas where there is a high endemic prevalence of intestinal parasitic diseases. Wilks and Sonnenberg[1] showed that 48.8% of 287 Korean returnee food handlers were positive for intestinal parasites; Radke[2] reported 50% of 93 Korean veterans to be infected with *Endameba histolytica.* As a result of these reports 53 repatriated personnel of the Korean Conflict were carefully examined at the Fort Knox Hospital laboratory.

MATERIALS AND METHODS

Three stool specimens were submitted consecutively for three days for each patient. In case the examinations on these stools were negative, saline purges were given and sigmoidoscopic examinations performed where the history suggested amebic infections. When a purge was given, three liquid stools were collected and examined macroscopically and microscopically *immediately upon passage.* The importance of immediate delivery of the stool to the laboratory and its *prompt examination* cannot be overemphasized. Cultural technics were employed in our specimens for the determination of the presence of *Endameba histolytica*[3] and bacterial pathogens. Each stool was concentrated according to the method followed in this laboratory:

1. A walnut-sized amount of fecal material is carefully selected from several portions of the stool and this amount of feces is emulsified in 20 ml. of normal saline.

2. The emulsified suspension of stool is strained through two layers of gauze into two 15 cc. centrifuge tubes, and the tubes filled within one-half inch of the top by the addition of normal saline.

3. These tubes are then centrifuged for 4 minutes at 25,000 RPM; the supernatant fluid is discarded.

4. The tube sediment is resuspended in saline as before, recentrifuged and supernatant fluid discarded repeating this procedure two more times. The two tube sediment is then examined by a wet stain method.[4]

a. The remainder of this tube sediment is used for zinc sulfate flotation which brings the helminth ova, larvae and protozoa cysts to the surface. The technic for employment of this test is that prescribed in The Methods for Medical Laboratory Technicians.[5]

b. The tube sediment for the second tube is concentrated by the acid-ether method described by Weller and Dammin.[6] A drop of the sediment is examined in a stained wet smear. Specimens from sigmoidoscopic examination are secured by means of a 1 ml. serological pipette. These are employed in parasitological examinations on direct smear for trophozoites, stained smears for cysts, and the Alicna's medium for culture examination for amebæ. Specimens secured with the serological pipette are also inoculated on to culture media for bacteriological examination.

RESULTS

The results are recorded in Tab'e I. It will be seen that each of the 53 harbored one or another pathogenic parasite. One case in addition had Shigella dysenteriae. Nonpathogens such as *Endamoeba coli, Endolimax nana, Iodamoeba buetschlii, Dientamoeba fragilis, Trichomonas hominis, Chilomastix*

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TABLE I

Parasites	Number of Cases
Endameba histolytica	11
E. histolytica and hookworm sp.	5
E. histolytica and T. trichiura	3
E. histolytica, hookworm sp. and T. trichiura	1
E. histolytica, A. lumbricoides and T. trichiura	3
E. histolytica, S. stercoralis and T. trichiura	1
E. histolytica, and ascaris lumbricoides	2
E histolytica, T. trichiura and G. lamblia	1
E. histolytica, hookworm sp. and S. stercoralis	1
E. histolytica, A. lumbricoides, hookworm sp., and H. heterophyes	1
Ascaris lumbricoides	5
Trichuris trichiura	4
T. trichura and hookworm sp.	2
Hookworm sp.	1
Hookworm sp. and A. lumbricoides	1
Ascaris lumbricoides and Strongyloides stercoralis	2
Strongyloides stercoralis	1
Ascaris lumbricoides, hookworm sp., T. trichiura	1
Ascaris lumbricoides, and G. lamblia	1
Ascaris lumbricoides and T. trichiura	6
Total	53

mesnili and *Enteromonas hominis* are not listed since they have no pathogenic significance.

Discussion

The methods employed are highly efficient in demonstrating intestinal parasites. Saline purges give the best results in demonstrating parasites, ova and trophozoites of *Endameba histolytica*. The sigmoidoscopic material was less useful in demonstrating ova, larvæ and adult worms but the sigmoidoscopic material was the best method for demonstrating the trophozoites of *E. histolytica*. The zinc sulfate flotation gave good results in detecting Helminth larvae and protozoal cysts but the acid-ether method was better for demonstrating tapeworm and Schistosoma ova. No one method proved 100% effective. For best results it is recommended that a battery of tests be employed.

Summary

Intestinal pathogenic parasitic infestation was demonstrated in all 53 patients who were repatriated personnel from the Korean Conflict. These data suggest the importance of the employment of a battery of examinations for the detection of intestinal parasitic disease.

Acknowledgment

Doctors Hannah and Hamilton referred the patients for examination. Doctor Clayton Weed secured the sigmoidoscopic specimens.

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The Preservation of Lung Tissue in the Treatment of Pulmonary Tuberculosis

By

COL. JAMES H. FORSEE, MC, *U. S. Army**

(With eight illustrations)

MILITARY medicine has pioneered the treatment of pulmonary tuberculosis in the United States. Early in this century Bushnell contributed lasting methods of detecting the disease by physical examination. During World War I these methods were applied to millions of draftees. His strong advocacy of rigid rest therapy occasionally resulted in a member of the military services successfully overcoming this affliction and contributing years of active duty. His work on the epidemiology of tuberculosis remains a classic.[2] Bruns, in the early 1920's, was one of the first to initiate the concept and practice of surgical therapy, for this disease, in the United States. At the time of his death in 1934, the military services had received wide recognition for contributions in this field.[1] The surgical removal of tuberculous lung tissue in the present era of chemotherapy has revolutionized the treatment of pulmonary tuberculosis.[3] Again the Armed Forces Medical Services have been pioneers in this new and fascinating chapter of man's struggle against the ravages of the white plague. So unprecedentedly good have been the results that actually only a temporary interruption is occurring in the career of military personnel undergoing treatment for this disease.

Case I. Patient "A," age 46, had his left upper lobe removed and a five-rib thoracoplasty performed in October 1951 at Fitzsimons Army Hospital. He is well, returned to active duty in March 1953, and has been on duty for more than a year. He states he feels fine, has no cough, pain or chest discomfort. He maintains his normal weight, golfs occasionally, and frequent examinations have not indicated any evidence of reactivation of the disease. Sputum and gastric washings have been repeatedly negative for *M. tuberculosis* since operation.

His clinical history is illustrative of many which are similar. In March 1951 he became ill and in April the diagnosis of pulmonary tuberculosis was confirmed by the isolation of *M. tuberculosis* from the sputum. A 3 cm. cavity was demonstrated on roentgenographic examination. Hospitalization and chemotherapy as streptomycin, 1 gram every third day and para-aminosalicylic acid, 12 grams daily, were started. Six months later there had been appreciable clinical improvement, a small cavity remained, and extirpative surgery was accomplished. The removed lobe contained a 2 cm. cavity. At operation, the upper lobe contained, in addition to the nodular cavity area, numerous smaller nodules. In the lower lobe there were scattered nodular areas and to remove the visible and palpable tuberculous disease would have resulted in the loss of the entire lung. The conservation of the lower lobe was considered feasible because of the effectiveness of chemotherapy. Further, decreasing the size of the hemithorax by a five-rib thoracoplasty aided in preventing over distention of the remaining lobe and probably decreased the danger of reactivation of latent lesions. No visible deformity results from upper lobectomy and a five-rib thoracoplasty.

Case II. Patient "B" returned to active duty in June 1953, 18 months after an upper lobectomy and a five-rib thoracoplasty. He has been in command of one of the Army's largest and oldest schools for more than a year and has remained well.

* Formerly Chief Surgical Service, Fitzsimons Army Hospital; now at Tokyo Army Hospital, Tokyo, Japan. Author—The Surgery of Pulmonary Tuberculosis, Lea & Febiger, Phila. 1954.

The concept of preserving involved lung tissue without increasing the risk of disease activation is a goal which has long been sought and is now being achieved. This has been achieved largely through the effect of streptomycin and other recently developed chemotherapeutic agents. Although their exact mode of action is not thoroughly understood, clinical and experimental evidence has demonstrated highly effective results closely coinciding with their increased employment. Streptomycin, 1 gram every third day for patients weighing 150 pounds or less and 2 grams for those weighing more than this amount, and Isoniazid, 300 mgm. daily, are currently the preferred agents and dosages.

These agents are more effective in bringing about the resolution of recently developed, exudative lesions. Of similar value is their facility in localizing the lesions which do not resolve. Further, the protracted use of these drugs, which is now feasible, favorably influences the stabilization of tuberculous lesions, reducing them in extent and increasing their suitability for surgical extirpation. The amount of lung tissue which needs to be removed is thereby decreased resulting in minimal diminution of pulmonary function. The combination of certain chemotherapy agents, especially streptomycin and para-aminosalicylic acid or Isoniazid, has virtually eliminated the development of resistance to the drugs on the part of the host. Thus, their use for extended periods following excision of the more involved tissue has an additive effect of securing permanency of inactivation of any remaining disease areas.

With the application of this concept of preserving lung tissue the removal of an entire lung has, in our experience, seldom been indicated. Pneumonectomy has been performed in less than five per cent of more than 900 tuberculous patients treated by extirpative surgery since 1 January 1947. This is in striking contrast to reports from other large experiences wherein the incidence has been as high as 50 per cent.[5] The excellence of the results achieved by preserving lung tissue has, it is believed, been feasible. Usually the lower lobe containing varying degrees of involvement has been retained and only the more extensively involved upper lobe removed rather than carrying out total pneumonectomy. Two hundred sixty-one patients were treated by lobectomy during the period 1947-1952, and in the vast majority there was appreciable disease in the remaining lung tissue on the operated side. Ninety per cent of these patients are now well, and working or able to work. Six and a half per cent are dead and three and a half per cent are not well, either because of tuberculosis or other causes. Pneumonectomy has been reserved for those patients who have a severe stenosis of the main stem bronchus which is usually associated with an extensively destroyed lung.

The concept of the preservation of lung tissue has been steadily extended. The retention of minimally involved segments of a lobe and removal of the more involved broncho-pulmonary segments of the lobe are our practice. This feature is greatly increasing the feasibility and practice of returning military personnel to active duty after being treated for tuberculosis.

The anatomy of the broncho-pulmonary segments permits their selective removal in an increasing percentage of patients treated by chemotherapy. (Figure I) An indication of this increase is depicted in noting that during 1947-49 only 25 patients were treated by segmental resection. Since 1 January 1953, 185 patients have received this form of surgical therapy. The disease process most often involves the apical and posterior portions of the upper lobe and these segments were removed in 75 per cent of the segmental resections. Segmental resection facilitates a strong recommendation for the removal of proved or suspected lesions. These may often be considered as evidence of healing or advice is offered to "watch and see what develops." Such lesions are unpredictable and operative removal is far safer than permitting them to remain.

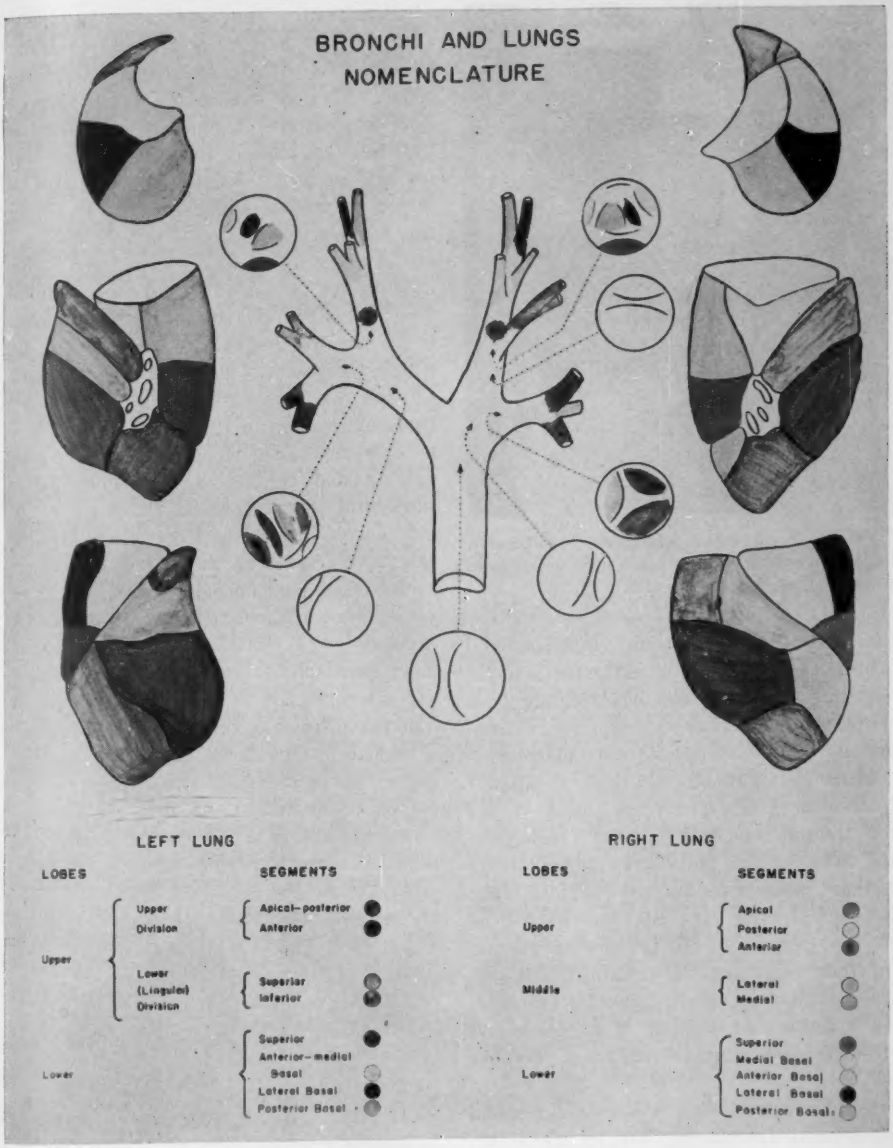

FIG. I. Anatomy and nomenclature of bronchopulmonary segments.

Case III. Patient "C," dependent of a member of the U. S. Security Forces, had a lesion noted on a chest roentgenogram in 1951 and was advised, without a positive diagnosis, to "watch it." (Figure II) Two years later a large cavity was present on the chest roentgenogram taken as a follow-up film and *M. tuberculosis* were isolated from the sputum. Extirpative surgery when the lesion was first noted would doubtless

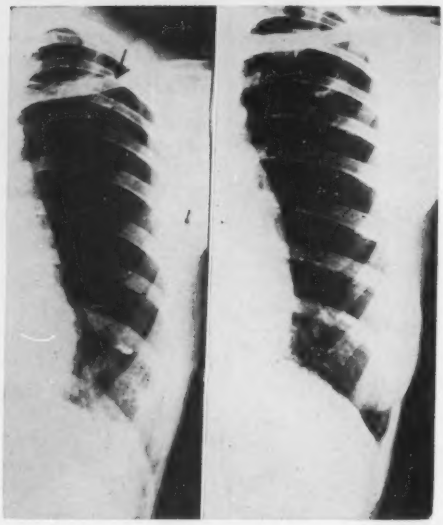

FIG. II. Small lesion, left upper lobe, becomes large cavity. It is safer to remove the undiagnosed lesion than to "wait and watch."

have revealed the specific organism and proper chemotherapy would have brought a lasting recovery. She has recently been operated upon after appropriate chemotherapy and her progress is satisfactory.

Case IV. Patient "C" had a positive sputum in 1947. After two years of bed rest sputum remained positive. Chemotherapy was started later and segmental resection was accomplished within four months. (Figure III) She has since been actively engaged in the practice of nursing for four years and has remained well.

Surgically, segmental resection requires the isolation and division of the respective bronchus and vascular structures. (Figure IV)

Certain factual data regarding segmental resection is illuminating. The extent of disease was classified as moderately advanced in 65 per cent, far advanced in ten per cent, and minimal in only one-fourth of the patients. The amounts of streptomycin administered varied considerably but two-thirds of the patients received the drug six months or less for a total dosage in three-fourths of the patients of not more than 100 grams. Complications have been few but technically lobectomy is often a sounder surgical procedure. This is due to the better defined interlobar fissure. A comparable division is less well established for the broncho-pulmonary segments. Cavitation was present in the resected specimens in 37 per cent of the patients.

A further effort to conserve lung tissue, minimizing the loss of pulmonary function and effectively combating tuberculosis, is the surgical removal of residual foci by simple wedge excision of the involved area. (Figure V) This method was employed ten times more often in 1953 than in 1948. The lesions suitable for wedge excision are usually situated peripherally and immediately subpleural. They represent either the residual foci of previously larger areas of disease involvement or the lesions may have been present and unchanged for months or years. None of the patients treated by wedge excision were classified as far advanced. They were about equally divided between the categories of moderately advanced or minimal disease according to the National Tuberculosis Standards. Cavitation, averaging 1 cm. in diameter, was present in the excised tissue in 24 per cent of the patients. Often the lesions are of comparatively long duration, many months or a few years, prior

FIG. III. Lesion noted on roentgenogram. Surgical specimen of segmental resection reveals several small lesions on cross section.

to their removal, and symptoms may be absent, mild or decreased due to the healing of a more extensive disease process. On the other hand, the lesions may have recently appeared and early removal relieves the patient of the uncertainty of their potential danger. If *M. tuberculosis* are demonstrated in the excised tissue, the patient is treated as having active tuberculosis, including chemotherapy and bed rest. If the lesion is a granuloma of non-tuberculous etiology, which is often the case, a protracted period of hospital care is unnecessary and return to duty or other occupation is accomplished on wound healing.

The need for the surgical extirpation of these foci, whether residual or of recent development, is based on several factors. An appreciable percentage, estimated from five to fifteen, of roentgenographically similar lesions initially detected are neoplastic and constitute an additional reason for their removal. Present knowledge does not permit accuracy in predicting whether or not the specific organisms are contained in the given lesions. Nor do we know whether or not demonstrable *M. tuberculosis* are necessarily viable. It is usually impossible to grow them on culture except from cavitary lesions. Yet this lack of growth on culture is no assurance that the organisms do not, *in vivo*, bring about progression of the disease. We do know that small lesions become larger ones and minimal disease is often the forerunner of a far advanced process. The meticulous study of military personnel diagnosed as having minimal tuberculosis revealed that the prognosis was poor. The study of a group of approximately 500 patients followed by painstaking methods for a minimum of a five-year period revealed that 50 per cent suffered relapse of disease activation.[6] Mitchell reported a high relapse rate among patients with minimal tuberculosis studied at Trudeau Sanatorium.[4] Comparable studies are not available since the use of streptomycin for minimal tuberculosis. Such patients seldom received chemotherapy prior to 1951. The surgical excision of these small lesions is feasible and practical and the mortality, in our experience, has been comparable to the removal of a diseased appendix.

FIG. IV. Segmental resection. Bronchus and vascular structures isolated and ligated.

FIG. V. Wedge excision of round lesion (enlarged).

The surgical aspects of the therapy of this disease are encompassing broader considerations. In 1953, one of every four tuberculous patients discharged from Fitzsimons Army Hospital had received surgical therapy. There is strong evidence that this increase in the incidence of surgical therapy will be

further enhanced and that there will be relatively few tuberculous patients who will not be benefited by proper surgery. This form of therapy is, therefore, rapidly resolving itself into the basic consideration of expertness in the exercise of judgment as to the tissue which should be removed and which areas may be safely retained in conserving lung function. This consideration transcends the technical capabilities of the operating surgeon and makes it necessary that he acquire proficiency in the full recognition and pathologic consideration of the disease process which he is treating. These considerations warrant his close coordination with and the combined efforts of the phthisiologist, roentgenologist, endoscopist, pathologist, and physiatrist. The analysis of the nature and extent of the disease preoperatively, the response to drug therapy, the evaluation of roentgenographic variations of the disease process along with their relations to the findings at operation and subsequently are fundamentals in proper therapy. The meticulous study and interest of the pathologist in the correlation of the surgical specimen which he receives from the operating room with his frequent observations at the time of surgery, together with the clinical history, bacteriological findings, and roentgenographic interpretations, enable him, in a large measure, to accurately appraise the effectiveness of therapy. The physiatrist has the important responsibility of preventing deformity and aiding in the patient's rehabilitation. The surgeon who successfully treats tuberculous patients properly employs the guidance of his associates and becomes a member of the tuberculosis therapy team, a championship combination which has replaced the one-man tuberculosis expert. In addition, the surgeon must painstakingly maintain follow-up studies for a protracted period on each patient before final assessment of treatment. We have achieved this objective and have followed 99.4 per cent of the more than 1200 patients undergoing surgical therapy since 1947.

Modern military medicine effectively provides the framework for the work of the tuberculous therapy team. A few hospitals have been designated and staffed with experts in their respective fields interested in the care of tuberculosis patients, including a program of complete rehabilitation. With these facilities efficiently functioning, the return to duty of those properly motivated for a career or extended period of military service is being accomplished. Recent legislation (Public Law 351) precisely fits this consideration by providing for temporary retirement and restoration to active duty. Fortunately, most of the military personnel need not be placed on temporary retirement and are able to resume active duty following hospitalization and rehabilitation.

Case V. Patient "D." Active pulmonary tuberculosis was diagnosed in September 1950. Sputum was positive. Cavitation developed in the right upper lobe. Chemotherapy, as streptomycin and para-aminosalicylic acid, resulted in clinical improvement and roentgenographic clearing but the cavitation remained. After eight months of such therapy surgical extirpation of apicoposterior segment of the upper lobe was accomplished. The removed segment contained a 1.5 cm. cavity. The other bronchopulmonary segment, the anterior, had a few scattered lesions which it was felt did not require removal. His postoperative course was uneventful and 16 months after surgery he gradually returned to active flying. He has remained well.

Case VI. Patient "E" had had mild symptoms of cough for three months but had not sought medical attention. Roentgenographic examination of the chest in July 1952 demonstrated a large cavity in the left upper lobe. (Figure VI) Chemotherapy and bed rest for six months were followed by segmental resection of the apical posterior segments which brought excellent results. Sputum has been negative since operation. Chemotherapy was continued for four months. She was placed on a leave status from the hospital nine months after operation and returned to duty three months later. She has remained well. The localiza-

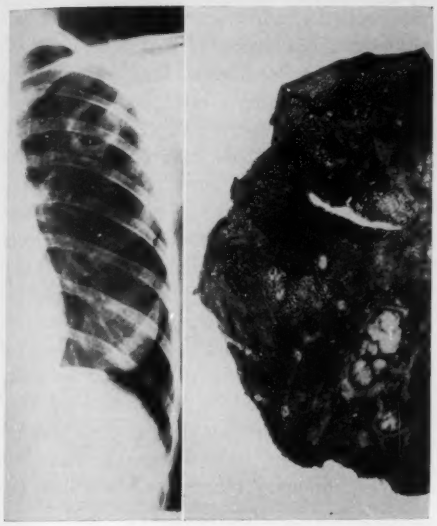

FIG. VI. Large cavity, left upper lobe. Surgical specimen of segmental resection containing small cavity.

tion of the disease and its extirpation are well illustrated in this case report.

An appreciation of the changing concept in regard to preserving lung tissue is depicted in the following case report. A female dependent of an officer, whose age was 35 in 1947, had had an abnormal shadow in the right upper lobe noted on the chest roentgenogram ten years earlier. Repeated efforts to demonstrate *M. tuberculosis* had failed. She had frequent episodes of mild symptoms which would subside after a few weeks' rest. Although she was never very ill, neither was she entirely well. Surgical extirpation was recommended and the entire left upper lobe was removed. A 2 cm. nodular area containing *M. tuberculosis* was present in the apical-posterior segment. The remainder of the lung contained only a few tiny nodules. It is reasonable to assume that confronted with similar conditions at least one-half of the lobe would now be preserved. (Figure VII) The patient has been well for several years and leads a normal life.

A lobe involved to the extent demonstrated in Figure VIII obviously required

FIG. VII. Lesion which would now be removed by segmental resection, preserving at least one-half of the lobe. Lobectomy performed in 1947.

total removal. True, in this patient as in most others with such extensive involvement, the remainder of the lung contains varying extent of tuberculosis. Eradication of visible and palpable disease would require total pneumonectomy. This patient, a negro soldier, had only the extensively in-

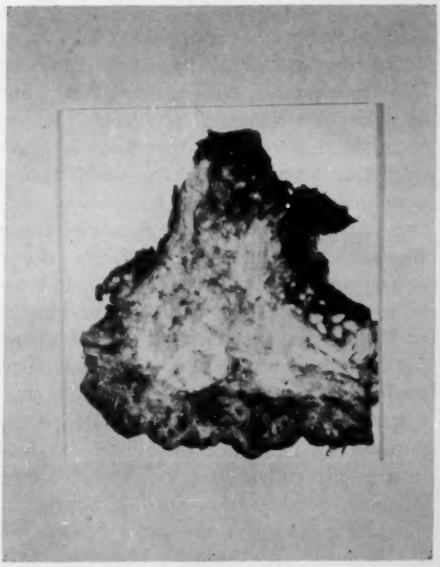

FIG. VIII. Extensively involved lobe, requiring lobectomy. Lower lobe was preserved, although it contained appreciable scattered nodules.

volved lobe removed. He has been well for several years, completed college—graduating from law school, and is a successfully practicing attorney.

In our experience, we have not found race or sex to have significant influence in the response to therapy if patients follow the recommendations offered. These and other observations, though our experience with tuberculosis among Asians has been limited, makes it tenable to encourage the contributions which the Armed Forces Medical Services may make and stimulate among the nations of the Far East, certain areas in Europe, and in our own Western Hemisphere. The potential contribution evolving from the military medical efforts is almost beyond belief. The teaching and training afforded in one military hospital alone is reflected in the fact that the yearly admission of patients having or suspected of having tuberculosis approximates 2000. With military assignments now being global in nature, qualified doctors, nurses, laboratory workers, and others in the field of tuberculosis are frequently in areas where the need is overwhelming. South Korea alone probably has more than a million of its twenty-two million population suffering from tuberculosis. Broad concessions must be made to attack such problems. The application of surgery to thousands who are treated on an ambulatory basis with appropriate chemotherapy and hospitalized only two to three weeks for the actual performance of surgery seems feasible. As revolutionary as this approach may appear to those of us who have long observed the benefits of hospital bed rest therapy, such is an impossible consideration in much of Asia. This project is an almost overwhelming challenge with an equal opportunity. Recent experience on a small scale in the Far East insures the author that the Armed Forces Medical Services can furnish substantial aid and guidance in the battle against this the Number One health problem of Asia.

In the military service the plan of roentgenographic examination at frequent intervals, such as induction, annual physical examination, separation from the service, reenlistment, admission to hospital, prior to overseas assignments, etc., provides the best facility for the early detection of pulmonary diseases and immeasurably contributes to the exceptionally good results being obtained in the treatment of pulmonary tuberculosis in military personnel. Fifty per cent of the patients in the group of localized disease in this report were detected by these methods. Similar means of disease detection are applicable to larger groups. The duration of the disease prior to surgery is being markedly decreased. In 1952 and 1953, two-thirds of the patients undergoing surgery for localized lesions were known to have had active pulmonary tuberculosis less than one year prior to surgical therapy and in approximately one-half of these the period was six months or less. Early disease detection affords the best opportunity for effective therapy. By way of reflection, this is so vastly preferable to the years required by and the uncertain results of "chasing the cure" prior to the present era, that comparison is odious.

A summation in the conservation of lung tissue in pulmonary tuberculosis and its favorable influence on permitting personnel to continue their military careers is portrayed in the experience of the author in the management of 439 patients treated surgically for so-called localized disease. The period is the chemotherapy era, 1 January 1947 to 31 December 1953. Localized disease is defined as any tuberculous process, cavitary or noncavitary, involving only one lobe and, at the time of surgery, limited to an area not exceeding the extent of lung tissue above the level of the second costochondral junction. Lobectomy, segmental resection, and wedge excision have been the surgical procedures employed. Thirty-eight per cent of the patients had evidence of cavitation in the excised tissue. Twenty-five per cent of the cavitary lesions, 2 cm. in diameter or smaller, were not detected roentgenographically prior to excision. *M. tuberculosis*

were not demonstrated prior to surgery in 40 per cent. The specific organism was, however, identified in the sputum, gastric washing, or surgical specimen in 86 per cent of the patients. In the remainder the diagnosis was based on the histopathology and the clinician's interpretation of the disease process. Since the beginning of 1952, four-fifths of the patients treated by extirpative surgery are in this category of localized disease. It is this trend of operating upon less extensive and more localized disease which is extending and so markedly improving the results of therapy. When 90 per cent or more of the patients undergoing surgery for pulmonary tuberculosis are in this category —and this is in sight, it is reasonable to predict that 99 per cent will make a complete and lasting recovery.

The results have been almost phenomenal. Of 165 patients on whom follow-up studies of two and one-half years or more are available, three patients are dead; only one had active tuberculosis at the time of death. There are inadequate follow-up data on two patients. Of the 160 surviving patients on whom there are follow-up data, 98.7 per cent are well, and working or able to work. Beginning in 1950 military personnel in this group who appeared to be properly motivated returned to active duty. Their capabilities to continue on duty have been of such quality that there is now no hesitancy in regularly recommending that career military personnel continue active duty. Many are now performing duty under varied conditions throughout the world. Pulmonary tuberculosis in military personnel of the United States is now being detected early and is usually a readily manageable disease which only temporarily interrupts their careers.

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Prolonged Combined Chemotherapy in the Treatment of Pulmonary Tuberculosis, Using Streptomycin, Para-Aminosalicylic Acid and Iso-Nicotinic Acid Hydrazide*

By

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AND

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PREVIOUS numerous studies have shown the anti-tuberculous effectiveness alone, and in various combinations, of streptomycin, para-aminosalicylic acid and isonicotinic acid hydrazide.[1, 2, 3, 4] Two important facts are apparent: First, the fairly rapid development of resistant strains of tubercle bacilli to these agents when used alone,[5, 6, 7] and contraposed to this, the delayed development of resistant strains when these agents are used in combinations;[8, 9, 10, 11] Second, prolonged continuous combined chemotherapy assures greater therapeutic response than short or interrupted courses of therapy.[12]

It was the decision in July 1952 to use prolonged combined chemotherapy, employing streptomycin, para-aminosalicylic acid (PAS) and isonicotinic acid hydrazide (INAH) since, at that time there were no reported series of cases so treated. It was the desire to determine, if possible, the therapeutic effectiveness of such therapy, the effect upon the development of resistant strains of tubercle bacilli, and whether such therapy would possibly obviate the necessity for surgery in at least some cases so treated.

MATERIALS AND METHODS

It was decided to treat all new untreated cases with the combination of all three agents for a minimum period of twelve months. This was to be accomplished without benefit of surgery or collapse therapy, unless such procedures were considered essential as adjunct therapy or possibly life-saving.

Unhappily, there could be no control series, using other combinations of these agents because of the small number of anticipated cases.

The background of fifty patients treated for twelve months or longer is shown in Table I.

The ages ranged from 20 to 67 years, with the majority in the 30 to 50 year group. There were six negroes and forty-four white patients. Four of these were female and forty-six males. Four patients had minimal, twenty-three moderately advanced and twenty-three far advanced tuberculosis. Nineteen had unilateral and thirty-one had bilateral disease. Thirty-four had cavitary disease upon pre-treatment chest films. Thirty patients had new exudative and caseo-pneumonic disease; one had predominantly old fibro-cavernous disease, and nineteen had mixed old and new disease.

The 14 × 17 chest x-rays were obtained at two to three month intervals and sputum examinations at approximately two month intervals. These were cultured on Lowenstein-Jenson's media and, if cultures were obtained, sensitivity studies completed for the three antibiotic agents using the same media, with streptomycin 10 and 100 micrograms per milliliter; PAS 1 and 10 milligrams per cent; and INAH 10 and 100

* Presented at the Medical Panel, 61st Annual Convention, Association of Military Surgeons of the United States, Hotel Statler, Washington, D.C. November 29-December 1, 1954.

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TABLE I

	Number of patients					50
Age:	20–30	30–40	40–50	50–60	60–70	
	12	12	14	7	5	
Race:	Negro	6		White		44
Sex:	Female	4		Male		46
Extent of Disease:	Minimal					4
	Moderately advanced					23
	Far advanced					23
	Unilateral					19
	Bilateral					31
	Cavitary					34
	Non-cavitary					16
Type of Disease:	New exudative and caseo-pneumonic					30
	Old fibrocavernous					1
	Mixed old and new					19
Regimen:	Streptomycin					1 gram every three days
	INAH					4 mg/kilo/day
	PAS					12 grams/day
Length of Treatment:	Twelve months					15
	Thirteen to eighteen months					22
	Nineteen to twenty-eight months					13

micrograms per milliliter.

Treatment regimen consisted of streptomycin, grams 1, every third day, intramuscularly; PAS, grams 4, three times daily; and INAH, 4 milligrams per kilo of body weight, divided in equal doses and given four times daily.

Fifteen patients have been treated for twelve months, twenty-two for thirteen to eighteen months, and thirteen for nineteen to twenty-six months.

Patients were observed for evidence of toxicity but specific tests, such as liver function studies, were not routinely carried out.

RESULTS OF THERAPY

Symptomatic Response: All patients manifested symptomatic improvement as evidenced by return of temperature to normal, decrease in cough and reduction in sputum. The average gain in weight was 21 pounds, with the greatest gain being 45 pounds and the least 2 pounds. Two patients remained unchanged. The weight gain occurred in the first three to six months and was a gradual progressive gain after which the weight usually remained relatively stable. One patient again became febrile after eight months of therapy, with spread of his disease.

Roentgenographic Evaluation: Roentgenograms were evaluated as slight, moderate, marked improvement, no change and worse. Cavity closure was read as apparent on ordinary 14 × 17 chest films. One patient showed moderate improvement at six months and at eight months became worse with the spread of his disease and cavity formation. One patient showed slight, three moderate, and forty-five marked improvement. The patient showing slight change had fibrocavernous disease and those showing moderate change had mixed new and old disease, with predominance of old fibrous or calcific elements. The average time required to show marked change was 3.4 months, the longest time being 9 months and the shortest time one (1) month. Thirty-one of thirty-four patients with cavitary disease showed appar-

TABLE II

EVALUATION OF THERAPY

Roentgenographic		
Worse		1
No change		0
Slight improvement		1
Moderate improvement		3
Marked improvement		45
Average time marked improvement		3.4 months
Longest time	9 months	
Shortest time	1 month	
Apparent cavity closure		31
Sputum Studies		
Positive acid-fast bacilli pre-treatment (Smear and/or culture)		50 patients
Sputum conversion		49 patients
Average period for conversion		2.6 months
Longest period	7 months	
Shortest period	1 month	
Sensitivity status during therapy obtained on nine patients		
Completely sensitive 50–70 days		8
Resistant to Streptomycin & INAH at 315 days		1
Weight Gain		
Average gain		21 pounds
Greatest gain		45 pounds
Smallest gain		2 pounds
Patients losing weight		0
Patients unchanged		2
Period of weight gain		3 to 6 months
Average period		5 months

ent cavity closure. Two showed marked reduction in size of cavity. One closed the cavity but again developed cavitary disease at eight months.

Bacteriologic Evaluation: All patients had sputum positive for acid-fast bacilli on smear and culture, or culture alone prior to therapy. All patients upon which sensitivities could be accomplished were completely sensitive except one. This patient was resistant to 100 micrograms of streptomycin. It was this patient who developed spread of his disease with cavity formation at eight months of therapy and at this time his sputum again became positive, the bacilli being completely resistant to streptomycin and INAH but sensitive to PAS. All other patients became negative and remained negative on smear and/or culture. The average period for conversion was 2.6 months, the longest being 7 months and the shortest one (1) month. One patient had a large cavity involving the entire right upper lobe, sputum became negative and has remained so although cavitary disease has remained.

Sensitivity studies after institution of therapy were satisfactorily accomplished on eight patients, other than the one mentioned above after 30 to 135 days of therapy. Seven remained completely sensitive. One remained completely sensitive to INAH and PAS but resistant to 10 micrograms of streptomycin—at 4.5 months.

Toxicity: There was no toxicity to any degree in the continued series except for slight to moderate gastric irritation from

the PAS which did not necessitate discontinuance of the medication. One patient was dropped from the series at one month of therapy due to severe hepatitis apparently as a result of sensitivity to PAS and INAH. Surprisingly, the patient's disease resolved, the cavity closed, and has remained so for two years. He is a diabetic.

Comment: Admittedly, this is a very small series of cases. However, the results have been satisfactory and often quite dramatic from the point of view of conversion of sputum, continued negativity, and continued improvement and stabilization of the pulmonary lesions. It is regrettable that more positive cultures could not be obtained for sensitivity studies after institution of therapy. It is, however, perhaps significant that the one case which was resistant to streptomycin at the beginning of therapy reactivated his disease and developed resistance also to INAH.

One patient had pneumoperitoneum for eight months, started because of severe pulmonary hemorrhage. Four patients had surgery. These had therapy for 21 to 26 months. Surgery was completed because of persistent apparently filled cavities or residual cavities either on P.A. films or on chest section radiography. These consisted of left upper lobectomy on one, right upper lobectomy on one, and right upper and middle lobectomy on two. A small cavity was found on the fresh specimen in two.

Grossly, the tissues showed marked fibrosis and several to numerous small areas of caseation. There was no evidence of endobronchial disease. Smears of material from cavity walls showed no acid-fast bacilli and to date cultures have been negative (one to four months).

Microscopically, areas of extensive fibrosis, small areas of caseous necrosis, and tubercle formation were present. Acid-fast bacilli were demonstrated on sections in the caseous areas and were few in three and numerous in one.

All patients except one are now in very good to excellent condition.

Discussion

Few studies have been reported using triple chemotherapy. The U. S. Public Health Service Cooperative Study, reported by Mount and Ferebee presents an excellent controlled series after thirty-two weeks of therapy.[13] They conclude that there is no advantage in the use of triple chemotherapy as compared to regimens using two agents. Tempel and co-workers[14] reported in February 1954, at the 13th Conference on Chemotherapy of Tuberculosis, on treatment of fifty-one cases for eight months and came to the same conclusion. However, Allen, Manay, and Yu[15] reported on treatment of one hundred and one (101) cases and considered triple chemotherapy to be advantageous because of higher conversion rate and emergence of fewer resistant strains, few toxic reactions and excellent results with surgery. The results of the presented series are comparable to those of Allen and coworkers. It is still too early to determine the value of long continued chemotherapy in this series since there is insufficient length of follow-up at this time. It seems probable at this time that such therapy will not reduce the number of cases in which surgery appears necessary.

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New Director of the Armed Forces Institute of Pathology

Captain William M. Silliphant, MC, U. S. Navy, became the new Director of the Armed Forces Institute of Pathology on August 1. He succeeded Brig. General Elbert DeCoursey, MC, U.S. Army, who has been designated as the Commandant of the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

One month before the Japanese invasion of the Philippines Captain Silliphant was assigned to the Naval Hospital, Canacao, P.I. He was captured and interned for 37 months. Upon his release after the war he was assigned as Chief of Medicine and Pathologist at the U.S. Naval Hospital, Long Beach, Calif. In 1947 he was transferred to the Naval Medical School, National Naval Medical Center, Bethesda, Maryland where for a period of five years he served as Director of Laboratories and Executive Officer as well as Consultant to the Professional Division, Bureau of Medicine and Surgery.

In the spring of 1953, Captain Silliphant volunteered as pathologist on a Wound Ballistics Research Team, being sent to the Far East for survey studies on Korean Casualties with particular reference to the influence of body armor on war wounds. He was in Korea at the time of the Korean Armistice and remained for operation Big Switch at Freedom Village.

Captain Silliphant is a Diplomate of the American Board of Pathology, a Fellow of the American Medical Association, the American College of Physicians, the American Association of Pathologists and Bacteriologists, and the American Society of Clinical Pathologists. He has contributed articles on bronchogenic carcinoma, eosinophilic granuloma, wound ballistics, and comparative studies of the Kahn and Cardiolipin tests for syphilis.

For distinguished service while a prisoner of war the Secretary of the Navy issued him the Navy Letter of Commendation with Commendation Ribbon.

Pre-operative and Post-operative Physical Therapy for Chest Surgery Patients— Review and Current Status

By
CAPTAIN CLARISSA HICKS, WMSC, USA*

SOME of the more common lesions involving the chest wall, supporting structures, and the intra-thoracic area which may require surgery are bronchiectasis, pulmonary abscesses, cysts, neoplasms, silicosis and anthracosis, penetrating wounds such as gunshot wounds and stab wounds of the chest, atelectasis and massive collapse of the lung, and tuberculous lesions.

THORACOTOMY

The chest wall is entered by means of a thoracotomy or a thoracoplasty. A thoracotomy is an incision into the chest wall and may involve the removal of one rib. The traumatized muscles are the intercostals, the lower trapezius, rhomboids, the latissimus dorsi, and the serratus anterior. Following a thoracotomy there is weakness and limited range of motion of the upper extremity on the operated side, weakness and atrophy of the intercostals, limited chest expansion, and a tendency toward postural defects which, unless corrected, will become permanent as postural habits or deformities. Because of spasm in the upper trapezius or to relieve pain, the patient may lift the shoulder on the operated side, or he may lift the opposite shoulder and allow the involved shoulder to sag. The head may be inclined to the operated side and the patient may carry his upper extremity against the body with shoulders and head forward in a position of kyphosis. The danger of developing kyphosis is increased if the patient remains in bed for a long period of time and is allowed to use large pillows under his head.

THORACOPLASTY

When a large portion of the lung or the entire lung is involved, a thoracoplasty may be performed. It is an extensive operation and may require as many as three surgical procedures. When a "radical" thoracoplasty is performed, two or more ribs, beginning with the first and often including the eighth or ninth, are removed along with the transverse processes of the adjacent vertebrae. In addition to the muscles involved in a thoracotomy, the scaleni, the erector spinae, and all other muscles having their origins or insertions on the ribs and transverse processes are severed. In a "modified" thoracoplasty, one or two ribs are removed with segments of other ribs. The resulting deformity is less. However, any thoracoplasty leaves a long, ugly scar, a sunken chest, and an imbalance of muscles and ribs. There are changes in the position of the head and neck, of the spine, and of the ribs on both the operated and the unoperated side. A scoliosis develops with the convexity of the curve toward the operated side. The hip on the operated side tends to tilt, and a secondary curve tends to develop in the lumbar region. The thoracoplasty patient requires a much longer convalescent period than does a thoracotomy patient.

THE ROLE OF PHYSICAL THERAPY

The aim of physical therapy is to restore the body to a normal or near normal state as soon as practicable. In the ideal situation the physical therapist visits the patient three or

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four times prior to surgery. She instructs him in proper bed positioning and explains the value of early mobilization of the upper extremity and the chest walls. She demonstrates how he may begin passive and active exercises to the involved upper extremity, and she teaches him correct breathing exercises to strengthen the intercostals, to develop a pattern of deep and even breathing, and to obtain full expansion of the remaining lung so that the chest cavity may be filled. She explains that proper breathing exercises may help to prevent the collection of fluid in the chest cavity. Diaphragmatic breathing is also taught. The patient should know that post-operative treatment begins as soon after surgery as the ward officer and the physiatrist think feasible. Unless there are contraindications, post-operative physical therapy treatments begin on the day following surgery. If there has been no opportunity to orient the patient prior to surgery, usually a few minutes of clear and careful explanation will gain the cooperation of the patient on the therapist's first visit after surgery.

Treatment of the Thoracotomy Patient

1. Bed Position should be hips level, legs straight, head and trunk bent *away* from the operated side. The bed should be kept as level as possible because it is usually easier for the patient to cough in this position. He is usually encouraged to cough to dislodge sputum plugs and other obstructions. He may have a small pillow under his head and pillows may be placed to relieve pressure on the drainage tubes.

2. On the first post-operative day, passive, active, and active-assistive exercises are begun to mobilize the involved extremity. They are kept within the range of comfort but early full range of motion in all planes is encouraged. There is *no* stretching until the incision is well healed and the sutures are removed. Exercises include flexion of the arm at the shoulder joint, abduction of the arm in all planes, adduction of the arm across the chest, and internal and external rotation. On about the third day the patient may begin mild exercises for the serratus anterior, and he may be able to progress to a sitting position while exercising. As soon as the sutures are removed, mild stretching exercises and exercises for the re-education of muscles of the lower scapular area are begun if deemed necessary.

3. Breathing exercises are begun on the first post-operative day. Pressure is applied to various parts of the chest at complete exhalation and lightened somewhat on inhalation. At first the physical therapist applies the pressure with her hands, and as the patient is able, she teaches him to apply pressure both with his hands and with a wide belt or a folded bath towel. By breathing against pressure, the intercostals are strengthened and the chest wall becomes mobile. By applying pressure to a part of the chest wall, emphasis is placed on that part and the patient is trained to mobilize any section. To develop diaphragmatic or abdominal breathing, the therapist places one hand lightly on the chest to insure that the chest muscles remain relaxed and immobile. The other hand is placed on the abdomen and the patient inhales, causing the abdomen to rise. He exhales by contracting the abdominal muscles. The patient inhales through the nose because the air passages of the nose are constructed to warm and filter the air before it reaches the lungs. He exhales through the mouth for more complete evacuation of air. Pressure should never be so heavy that the weakened muscles cannot overcome it. As soon as the patient has full active range of motion of the upper extremity, he may improve his breathing by inhaling as he lifts his arms and exhaling as he lowers his arm. When he lifts his arm the ribs also tend to be lifted and expansion is increased. He may also increase the mobility of the chest walls on the operated side by lying on the unoperated side with the arm on the operated side above the head in a relaxed position. He then breathes deeply and rhythmically.

Treatment for the Thoracoplasty Patient

Treatment of a thoracoplasty patient is the same as that for a thoracotomy patient *except* that the bed position is different. Because the scaleni muscles are detached from the first and second ribs, the upper trunk and the head are bent *toward* the operated side. Also, because of extensive surgery or complete removal of one lung, diaphragmatic breathing is stressed.

Convalescence of the Chest Surgery Patient

As the patient convalesces, the physical therapist must be constantly on the alert for postural deviations, weakness and tightness of the involved muscles, and for muscles which may require re-education. By the third or fourth day following surgery, the patient should be able to perform excercises from a sitting position. Soon thereafter, he is able to perform his excercises while standing. His posture should be checked daily before a mirror and he should be able, eventually, to evaluate and correct his postural defect. On about the seventh day, post-operatively, the patient should be able to come to the clinic for his exercises. The shoulder wheel, the abduction ladder, and wand exercises are added to his routine. He may also be able to exercise with three to ten pound weights. In about fifteen days following surgery, the thoracotomy patient is allowed to go on leave. Prior to leave he is given careful and thorough instructions for continuing his exercises. When the patient returns to the hospital he is evaluated and is usually able to return to duty. The average leave time is about thirty days. Tuberculous and thoracoplasty patients require several additional weeks of treatment by the Physical Therapist and the Reconditioning Department.

Precautions

The following precautions should be taken by the physical therapist:

1. Do not treat a patient whose temperature is 100 degrees of over. Report any alarming symptoms to the ward officer or to the physiatrist.
2. Observe prescribed sterile technique when treating tuberculous patients.
3. Avoid exercises which over-tire the patient. This is especially important when treating patients who have been ill for some time.

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Observations and Investigations in Veterinary Medicine in Haiti

By
D. L. Bush, D.V.M., M.S.
U. S. Operations Mission to Haiti

(With five illustrations)

THE Republic of Haiti comprises the western portion of the island of Hispaniola, the eastern portion being known as the Dominican Republic. The island lies at the eastern tip of Cuba, on a latitude slightly to the south. The republic covers approximately 11,000 square miles, with a great portion mountainous. The population of Haiti is slightly over 3,000,000; 150,000 of whom live in the capital city, Port-au-Prince. The National language is French, although only ten percent of the people are able to speak that language. Everyone, however, speaks and understands creole, which is a patois of French, English, Spanish, and African dialects. Creole is essentially a spoken language and not a written language, and herein lies the serious basic problem in educational work. There is a high percentage of illiteracy.

The predominant animal protein food in the diet of the average peasant is goat meat.

Goats being able to eat herbs and brush do the best of the livestock. Goat meat is eaten a great deal in the country and undoubtedly furnishes the majority of the animal protein taken into the body by most peasants. The majority of the goats are not the dairy type as this female will show. Neck yokes are common on all types of animals as a method of restraint.

Some goats are slaughtered in the slaughter houses, but the slaughter and transportation charges are high in comparison to the value of the animal. A goat is worth two dollars, and the tax on it is about one dollar. The goat is an important animal in certain Voodoo ceremonies, as also are the fowl and pigeon. It is during these ceremonies that the Haitian peasant enjoys his feast of goat meat after the sacrifice.

Most dairy and meat products are imported for the local elite, foreigner, and tourist hotel trade. The slaughtering in the local abattoir in Port-au-Prince averages about 30 animals a day. The abattoir was built in 1893, along the French architectural design of that day. Sanitary facilities are not of the modern type; inspection of carcasses is carried out by lay sanitary inspectors. The liver may be examined, but lymph gland examination is seldom done. Since there are no cold storage lockers or reefers it is necessary to dispose of the slaughtered animal immediately.

Seafood, in general, is available only along

The Port-au-Prince slaughter house built in 1893.

the coastline. Poultry, for the most part, is of the game variety.

There is one pasteurization plant in Haiti which is located at the agricultural school. There is also a plant which handles reconstituted milk. Most of the milk is sent to large towns and cities. Milk of native cows, crossed with Zebu, Brown Swiss, and Jersey, averages from 3.5-5.6 percent butter fat content. Peasants seldom drink milk and do not know how to cook with it. The milk in the provinces is sold in towns and is not pasteurized. Unfortunately there is no plant inspection or bacteria control of any dairy product.

Livestock Diseases of Economic and Public Health Significance

Anthrax. Anthrax is prevalent in three general zones in Haiti. These are the Cul de Sac plain and the Port-au-Prince suburbs of Kenscoff and Petionville, Artibonite valley region, and the Cayes-Torbeck-St. Louis du Sud regions. Nearly twenty-two thousand inoculations were carried out during 1952-1953 in order to control the disease. However, due to the unsatisfactory meat inspection service and other pertinent factors over twenty-six recognized cases of human anthrax were admitted to the hospital in Port-au-Prince. There are few hospitals in the interior with adequate staffs and diagnostic facilities, and perhaps other cases go unrecognized. Anthrax vaccine is given free of charge by the Haitian Department of Agriculture for those areas which require it.

Hog Cholera. Hog cholera is widespread in Haiti. One of the reasons being that peasants must pay for the vaccine which sells for three gourdes (60¢) per dose. The average yearly earnings of the Haitian peasant has been estimated at about fifty dollars per year.

Nutritional Deficiencies, Parasitisms and Other Diseases. Borderline nutritional deficiencies and subpatent osteomalacia are the rule rather than the exceptions of most species of livestock in Haiti. Parasitisms, both external and internal, are widespread in all

Native pigs have long legs and run like dogs. This pig shown above has the typical yoke on it. The surroundings give an indication of the food present in this area. Pigs, as the other animals, must scrounge for their food. Human feces and the feces of other animals may supply the main source of food for pigs and chickens in many areas.

areas of the country. Many areas of Haiti have a six to seven months drought period. During this period the vegetation is burned under a 100 to 120°F. degree sun. One is amazed and astonished how any animal could survive such conditions. Livestock can be seen trying to climb trees to eat tropical tree pods on which many survive during these periods. Overgrazing and crowding exist in all areas. Large bands of goats contribute to soil erosion by eating tree seedlings and shrubbery in mountain and watershed areas. All types of livestock and poultry are allowed to roam wild over the countryside in search of food. Cattle may be observed trying to eat limestone rocks and bones.

Haemonchus contortus and *Oesophogostonum radiatum* infestations are prevalent in cattle. *Boophilus microplus* infests all cattle in all parts of the country. Screwworm and blowfly infestations are common, and result from injuries due to neck yokes that cattle and other livestock are burdened with, and from firebranding which usually is done the

Zebu-native cross showing symptoms of osteomalacia. The pasture is among scrub trees. The pasture is overgrazed as can be seen and animals resort to eating green vegetation from the trees. Borderline osteomalacia in the majority of the animals reflects the quality of meat coming to market.

entire length of the body.

To date Anaplasmosis and Piroplasmosis has not been diagnosed in Haiti despite the examination of many blood smears of cattle during periods of fever and, or hemoglobinuria. *Boophilus microplus* on bovines and *Dermacenter nitens* of equines is very prevalent in all parts of the country.

Red water disease causing hemoglobinuria, and probably due to *Clostridium hemolyticum,* appears to be epizootic in certain areas of the country, principally the Anse-à-Veau area. These animals were negative to the blood smear test for piroplasmosis. The mortality rate is high among such animals.

Occasional outbreaks of paratyphoid fever in adult cattle and swine are seen. Cattle die in three to five days following a fetid blood tinged gelatinous diarrhea and sloughing of the intestinal mucosa.

Simulium sp. is believed to be prevalent in various areas, where their attacks of men and animal are serious. Horn flies are present in enormous numbers and take their toll.

Swine are infested with ascarids, kidney worms, thorn head worm, trichina, nodular worm, and lice. Nodular worm infestations in cattle, swine, goats, and sheep are universal, and few adult animals have been seen without them upon autopsy.

Coenurus cerebralis is quite prevalent in humans in Haiti. The reservoir is the goat. The brains are seldom eaten by humans and are usually given to the family dog—the disseminator.

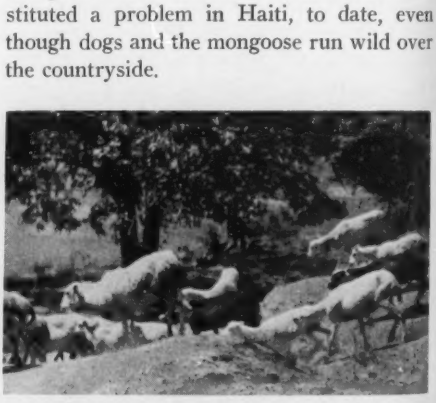
Hymenolepis nana of rats and mice is found in humans.

Acute fatal hookworm disease is very prevalent in dogs. Human cases of hookworm are also common. Most native peasants go barefoot and many eat with their fingers under extremely poor environmental sanitary conditions.

Filariasis (*Dirofilaria immitis*) has also been diagnosed in dogs. *Rhipicephalus sanguineus* and *Dermacentor variabilis* infestations of dogs are common. *Ctenocephalus sp.* is also common as is pediculosis of dogs, hogs, goats, poultry, etc.

Fasciola hepatica is prevalent in certain areas only, but animals dying and autopsied revealed fulminating infestations.

Rabies takes an undetermined toll among man and animals each year. In some areas of Central America, it has been reported that cattle raising had been unprofitable in the past due to Rabies. This has not constituted a problem in Haiti, to date, even though dogs and the mongoose run wild over the countryside.



Typical sheep in Haiti are seen above. They have long legs and poor body conformation and scrounge for their food. Lamb is seldom seen in the markets. The flock of sheep have mange. As the animals live on wild vegetation their meat has a poor taste.

Mastitis is present and many cases seen have been purulent in nature. Calves suckle until they are one or two years old. Calves

are also used as primers on the cow to start the milk flow. It is also believed that tarantulas may cause a toxic mastitis as these pests live in holes in the ground and come out during the rainy season.

Haiti recently recovered from the ravages of a Newcastle enzootic. Poultry management and husbandry practices are primitive as mentioned previously. Poultry are usually never housed and fed in the provinces. Poultry run wild over the countryside in search of food. Newcastle, fowl cholera, fowl pox and coryza are the major diseases of poultry.

When a peasant has a good crop, he buys an animal, which acts as his bank. These animals ensure him of ready cash when he may need it. Also, as most peasants do not own their own land, if they are evicted they can always take their animals with them. A great deal of money is paid to houngans (voodoo priests) for treatment of animals. A favorite remedy is macerated cockroaches and some sort of worm from the soil. This mixture is applied to the hard palate after scarification of the mucous membranes. Consequently, many cases of tetanus are seen in horses as this is one of the most favorite remedies for colic. The same remedy is said to be used on humans and is widely known.

Fungus infections are seen in animals; Actinomycosis is seen occasionally but is not widespread.

Little is known on bovine tuberculosis in Haiti. Testing has never been done on a wide scale in the interior. Of three-hundred and forty-two animals recently tested, eighteen should be classified as reactors to the intradermal test.

Nothing is known about Brucellosis in Haiti, either animal or human infections except the fact that it is present.

Conclusion

Twenty-five per cent of the total world cultivable area or 4,200,000 square miles lies in the tropical regions of the world. Thirty per cent of the land in the world is arable and the feeding of bulk without adequate nutrients is all too common in most tropical areas. The tropical regions of the world are reported to show the most promise of development. As the livestock industries expand through better livestock husbandry and management practices in these areas, poor environmental sanitation, zoonoses, and lack of suitable animal protein inspection systems could cause staggering losses in animal protein foods from disease, spoilage, wastage, improper storage and refrigeration. These problems also constitute a serious drain of foodstuffs in any community, create public health problems, and deprive the world market of needed food elements.

It is the function of the United States Operations Mission to Haiti to assist that government in solving some its problems in its efforts to provide a better food supply for its 3,000,000 inhabitants.

Sanitary Engineering in the Navy*

By
BURR LENHART, P.E.†

AS MILITARY surgeons, I need not enlighten you on the part played by the Sanitary Engineer in the overall military program.

The sanitary engineering organizations of the Army and Air Force, particularly in their relation to the Office of the Surgeon General, are well understood by the Association of Military Surgeons and others generally. Little common knowledge exists, however, of the sanitary engineering activities of the Navy. For that reason, the subject upon which I have been asked to speak to you, "Sanitary Engineering in the Navy," is one that might well be discussed at this Meeting. Since you are aware of the public health aspects of the sanitary engineer's responsibilities and functions in the health program, I need tell you only how the Navy administers and implements its Sanitary Engineering Program.

The relation between the Navy's Sanitary Engineers and its Medical Officers has not yet been clearly defined and is not generally understood. Perhaps the real reason for this lack of understanding lies in the fact that the Navy has no Sanitary Engineer Corps, as such. Navy's Sanitary Engineering Program is directed by civilian engineers acting as consultants to officers of the Civil Engineer Corps of the U. S. Navy. Military administration of the Bureau of Yards and Docks is vested in that Corps.

The Bureau of Yards and Docks holds cognizance over Navy's public works construction ashore, and has technical control of the maintenance and operation of public works, including utilities, at all shore installations. While the numbers of civilian Sanitary Engineers in the Navy are relatively few, that fact alone does not necessarily indicate any lack of basic sanitary engineering control of Water Supply, Sewage Works and Refuse Disposal facilities and practices.

Members of the Civil Engineer Corps, United States Navy, as their designation implies, are all graduate engineers. As Civil Engineer Corps Officers, they are subject to various assignments: in design of public works; as Officers-in-Charge-of-Construction during the actual building of public works; or later, as Public Works Officers in charge of administration of public works facilities at local activity level and higher. As Civil Engineers these officers have a general knowledge of Sanitary Engineering requirements. When special knowledge other than this is required, expert advice is available to them within relatively easy call either at Naval District level or at the Bureau of Yards and Docks. The technical services of officers of the Medical Corps and Medical Service Corps, Bureau of Medicine and Surgery, are available to check health hazards. The Medical Officer and the Public Works Officer at the field activity work hand in hand toward the goal of eliminating hazards to the health of naval personnel and their supporting civilian populations. The relation between these Officers in health matters is based directly upon the relations which exist between the two Bureaus in regard to their separate responsibilities.

The Bureau of Yards and Docks is responsible for the provision of sanitary facilities at naval shore activities adequate to meet the needs of the activity for Water Supply, potable and otherwise, and for Sewage and Refuse Disposal. The Bureau also holds technical control over the operation of these facilities to the extent that it must give

* Presented at the Sanitary Engineering Section, 61st Annual Convention, Association of Military Surgeons of the United States, Hotel Statler, November 29-Dec. 1, 1954.

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technical advice as to how they should be operated to best meet the needs of the activity. These needs must be met in accordance with the minimum requirements of the Bureau of Medicine and Surgery and, in a broad sense, the requirements of Municipal, State and other health authorities.

The Bureau's responsibilities, in the case of Water Supply, extend not only to its treatment but it must also make sure that proper and adequate means of distribution of water from its source to the points of demand are provided and operated in such fashion as not to present hazards to the life and health of naval and other populations served.

In Sewage and Refuse Disposal, the Bureau is charged with the provision of disposal facilities, employing appropriate treatment processes, to meet the minimum requirements of cognizant civilian health authorities in all cases where it is shown that adjacent communities and municipalities are being required to do likewise. In any case it is responsible for providing facilities capable of meeting the environmental and other standards of the Bureau of Medicine and Surgery.

It might be well, at this time, to consider administrative development of engineering and medical practices in the Navy. Since early days, maintenance and operation of sanitary facilities at activity level, as a general rule, have been under the control of the Public Works Officer, a member of the Navy's Civil Engineer Corps who serves as a Department Head for the Commanding Officer. A Medical Officer is assigned to duty in a parallel capacity to insure that proper health standards are maintained. The next higher step in the normal administrative and military command lies at the Naval District level. Here, on the staff of the District Commandant, or attached thereto, among the many necessary components of his office, are the organizations of the District Medical Officer and the District Public Works Officer. Here, too, the professional relations between the District Public Works Officer and the District Medical Officer, in matters pertaining to the health of Navy personnel, are similar to those which exist at the activity level. From here, also, the District Public Works Officer furnishes engineering guidance directly to the activity in those rare cases where no Public Works Officer has been assigned. These District Officers, moreover, constitute the principal control link in the administrative chain between the naval activity and the Bureau of Medicine and Surgery and the Bureau of Yards and Docks at Department of the Navy level. Close liaison between these sanitation control authorities exists at each step of this administrative ladder.

The advance in Sanitary Engineering practices in the Navy during the past can only be described as having occurred in a series of fits and starts. Regarding Water Supply the Navy has always treated its supplies to meet the particular usage needs. This, of course, was fundamental, in that it had to be done in the interests of health and to adequately and economically meet the requirements of daily water use.

The same cannot be said regarding Sewage and Refuse Disposal. It must be recognized, of course, that no great amount of information relative to this subject was available in early days. Treatment and disposal practices of a far lower order than those used today were commonly accepted at all levels of society. The engineer of the earlier days was inclined to dispose of sewage and wastes the easy way and at the least possible cost. That generally meant burning it or dumping it into the nearest waters. The Navy formed no exception to this rule: however, it would not be entirely fair to criticize the Navy too severely for following the practices it did during this time. Everyone else did likewise. With the growth of vast population centers and with a national industry increasing by leaps and bounds, it was inevitable that a change should occur. As you know, during the 1920's agitation for pollution control legislation started: in the 1930's such legislation sprang into being on a wide front, and 1940 saw industry,

municipalities and others being haled into court to show reason why State and other pollution control laws were not being complied with.

In 1940, under the leadership of Admiral Ben Moreell, CEC, USN, as its Chief, the Bureau of Yards and Docks took its first long step toward the provision of sanitary engineering service, as such, to the other Bureaus of the Navy and to their field activities. With the coming of World War II, and the necessity for the decentralization of effort if the tremendous naval public works construction program were to be accomplished, Admiral Moreell established the Offices of the Superintending Civil Engineers in several Areas for the purpose of exercising close supervisory control over the construction activities being expedited therein. Each Area covered more than one and, in some cases, parts of several Naval Districts. Realizing the heavy impact of antipollution legislation in the various States upon the sanitary engineering phases of the contruction program, a qualified Sanitary Engineer, with appropriate staff, was assigned to the Office of the Superintending Civil Engineer in each Area. These Sanitary Engineer Officers, selected from the Civil Engineer Corps Reserve because of their specialized training, were required to review and approve all sanitary installations, including Water Works and Sewage and Refuse Disposal Works to insure that the environmental standards and requirements of the Bureau of Medicine and Surgery were being met, and that the installations were acceptable to the U. S. Public Health Service and to cognizant State health authorities. A central sanitary engineering authority established within the Bureau of Yards and Docks gave guidance to the field officers and determined policy matters and performed other necessary administrative duties. Close liaison with the Bureau of Medicine and Surgery at Bureau level was maintained during this period of policy determination. It was at this time also that the Bureau prepared and distributed to the field numerous technical publications and manuals covering the operation and maintenance of water supply systems and sewage and refuse disposal systems. This sanitary engineering organization functioned during the entire World War II period.

The next development came with the cessation of hostilities and the resulting slump in naval public works construction. The practical need for the Offices of Superintending Civil Engineers terminated, and those offices together with their staff complements, including the Sanitary Engineers, were abolished. During the period when the Superintending Civil Engineers had been functioning, however, Sanitary Engineering Divisions had been established in the 11th, 12th, and 13th Naval Districts, which covered the West Coast States and several of the other States west of the Rocky Mountains. Because of the temporary continuation of Public Works construction on the West Coast, and the continuing need for sanitary engineering services during such construction, these Sanitary Engineering Divisions continued their operations under the various District Public Works Officers. Thus, a nucleus of the present organization was preserved, and the later task of fully organizing it made less difficult.

In March, 1948, the Chief of Naval Operations approved a reorganization of District Public Works Offices. In September of that year, the Chief of the Bureau of Yards and Docks, by a letter to all District Commandants and District Public Works Officers, implemented the Chief of Naval Operation's directive and established a standard organization and staffing of District Public Works Offices. Among the specialized civilian positions established was that now referred to as the Director, Sanitary Engineering Division. At the present time, twelve (12) of the fifteen (15) Naval Districts have such Sanitary Engineering Divisions, all staffed to meet the requirements of their particular Naval District. The remaining three (3) Naval Districts obtain any necessary sanitary engineering service by loan

from other Districts, or by contract, or from other Government agencies by exchange of funds. Thus, the engineering services of these specialists and those of their staff are made available to all naval activities in all Naval Districts. An additional Sanitary Engineering Division has more recently been established in the Office of the Director, Pacific Division, Bureau of Yards and Docks, from which services are made available to those activities located at far flung points in the Pacific Ocean area. A similar Sanitary Engineering Division is being considered for establishment in the Office of the Director, Atlantic Division, Bureau of Yards and Docks, from which sanitary engineering services are presently being provided to activities in the Atlantic Ocean area either by loan from Naval Districts, by other Government agencies, or by contract.

Central control of its sanitary engineering organization is exercised at the Bureau of Yards and Docks by a small engineering staff which has been identified with the general program since its inception. With a small staff, under the present limited personnel ceiling, we sometimes find ourselves hard put to coordinate the efforts of our parallel field offices and formulate the numerous programs which constantly develop in this specialized engineering field. It can be understood why we limit such central control to the minimum necessary to insure that the measures employed at District level are in accord with recognized sanitary engineering practices and that the standards of sanitation established by the Bureau of Medicine and Surgery are being met in the operation and maintenance of water supply and sewage and refuse disposal facilities at naval shore activities. The principle of decentralization of responsibility and authority makes it necessary that conflicting opinions be resolved and operating problems be *met* and *settled* at District level between the Sanitary Engineers and the Preventive Medicine Officers, except where problems of broad general significance can be discussed and answers found at Bureau level. A great deal has been accomplished in this latter respect, and the results of decisions made at Bureau level have been reflected in the several technical publications already issued or now being prepared by both Bureaus. Technical Publications on the Design, Construction, Maintenance and Operation of Water Supply Systems and Sewerage Systems have been prepared by the Bureau's sanitary engineering staff and are presently being used with good results at District and activity levels.

I believe that I have described the Navy's Sanitary Engineering organization, insofar as the public health aspects of the work is involved. To go further and explain to you the Navy's many excursions into the field of Sanitary Engineering Research would require much more time than is available. The main interest, I am sure, lies in the public health aspects of the Navy's program. I believe that I have covered those points.

Draping the Iron Curtain Over Hungary

*Observations of a U. S. Surgeon of the Allied Control Commission during the critical years of 1945-47**

By

RICHARD T. SHACKELFORD, M.D.

THE experiences and observations behind the Iron Curtain that I have been requested to describe resulted from my assignment as surgeon to the U. S. Military Representation of the Allied Control Commission of Hungary and Romania from August 1945 to January 1947. Therefore, they are eight years or more old, but since events of these early post-World War II days were overshadowed by the recent ending of the war, by the hue and cry for rapid demobilization of our armed forces, and by the shocking attitude of some of our former allies at various supposedly peace conferences, it is thought worthwhile to recount them.

This discussion will be limited to the experience in Hungary while a later paper will deal with that in Romania. The events are described by memory from brief notes jotted in a personal diary and may err in some minor detail.

My evacuation hospital (of which I was Chief of the Surgical Service) was situated in Northern Italy, not for from Trieste, when the European phase of the war ended.

It was there that I had my first contacts with communists, Tito's partisans. Their soldiers were a friendly lot who played volley-ball with us and enjoyed our cigarettes while entertaining us with accordion music and local dances. It was a rude awakening therefore when, a few days later, our ally Tito gave the British commander, General Freyberg of New Zealand, an ultimatum to withdraw all British and American soldiers from the Trieste area within 48 hours or else. As I recall it, Field Marshall Sir Harold Alexander met with Tito and they compromised by Tito withdrawing his troops 25 miles east of the town, the Americans withdrawing westward to Gorizia (:Görz) and the British southward to Montfalcone, while 5000 troops of each nationality were to remain in Trieste under Allied Command and the civilians were to be governed by an allied military government. Tito stipulated, however, that his withdrawal should not prejudice his claim on Trieste at the future peace conference, a point which was prominent in the subsequent dispute between Italy and Jugoslavia over Trieste. Meanwhile Croatian refugees from Yugoslavia, former adherents of Mihailović, streamed by our tent hospital where they asked for and often received left-over food, leaving harrowing tales of their persecution and even massacre by the partisans. Even though these may have been exaggerated, the plight of the people themselves jolted us for a second time into the suspicion that communists might not be the good fellows, warm friends and allies that we had been told they were.

While at this location outside of Udine I was ordered to Naples to be transferred to Budapest, Hungary. There was considerable delay while awaiting Russian clearance to enter Hungary, which gave me an opportunity to learn some Hungarian history, which proved most helpful in understanding the later course of events.

I learned that the Magyars (who have been the dominating Turanian race in Hungary) are believed to have originated in Southwestern Asia whence they migrated and fought their way

* *Editor's note:* For the subsequent early years of the Sovietization of Hungarian military medicine see the article of Dr. Claudius F. Mayer: "Contemporary military medical affairs in Captive Hungary, publ. in the Military Surgeon, 1952, vol. 111, p. 114-127.

through Bessarabia into the territory that is now called Hungary (896 A.D.), where they settled in 906 A.D. and have remained ever since. They were a warlike group which in the following 100 years successfully invaded the territory of Germany, France, and Italy, only to lose the conquered areas in later defeats. They were christianized by Stephen around 1000 A.D. and became the bulwark that turned back the repeated attempts at the invasion of Europe by the Turks until finally annihilated by them at the battle of Mohacs in 1526, after which Hungary was overrun by the Moslems who penetrated as far as Vienna.

The Turks occupied Hungary for 150 years before being driven out by the Austrian Habsburgs (1699) who changed the Magyar monarchy from an elective to a hereditary one under Habsburg succession. In 1848-49 the Hungarians, led by Louis Kossuth, revolted against the Habsburgs and were on the threshold of success when Russia came to the aid of Austria and crushed the Magyars. A fact they have not forgotten. However Kossuth had escaped and drummed up so much sympathy for the Magyars by speaking tours in England and America, that tottering Austria conceded equal rights to the Hungarians in 1867, and the dual Austro-Hungarian Empire was formed. Oldtimers are still grateful for Anglo-American moral support in this accomplishment.

Austria-Hungary (with the latter a reluctant party until her natural enemy, Russia, came to the aid of Serbia) started World War I after the assassination of the Austrian arch-duke in Sarajevo. They lost to the Allies in 1918. In 1949 the communists led by Russian trained Béla Kun, took over the country for four months before being driven out by the Romanian army, and later by an army of Hungarian patriots led by Admiral Nicolas Horthy. Hungarians are proud of the fact that they scotched the spread of communism beyond Russia at that time. (Incidentally, an Allied Control Commission, including American General Bandholtz, was established by the Allies to rule Hungary until the peace terms were completed. Bandholtz apparently endeared himself to the Hungarians by single-handedly attempting to prevent the liberating Romanian army from looting Budapest's art treasures. They erected a full length statue of him across the street from the Parliament Building. This statue survived the 1944 siege and was still standing when I arrived in Budapest but since relations deteriorated between the communists and ourselves it was later removed, I know not where.)

Then came the Treaty of Trianon in 1920 by which the Austro-Hungarian Empire was dismembered, Austria and Hungary were separated and each greatly reduced in territory, including deprivation of access to the sea. The Magyars are still bitter about this treaty which they consider unfair to a country that had defended Europe against the Turks for 500 years, was the first nation in Europe to officially adopt Christianity, instituted and retained an elected, rather than hereditary monarchy, and crushed communism. It is their blackest memory, and Wilson and the United States receive the major portion of the blame.

After the defeat of the communists the withdrawal of Romanian troops and the Versailles Peace Treaty, Horthy was the national hero and named Regent of the 1000 year old monarchy until a new monarch could be elected. This has never been done, however, and Horthy still ruled when World War II broke out. He apparently would have preferred to have taken a neutral position but Hungary was situated between two opposing forces like a football between two rival scrimmage lines, and had to make a choice. Communist Russia was dreaded more than Nazi Germany, so the Hungarians reluctantly joined the Axis forces, preventing occupation of their country in the early years of the war. However, Hitler suspected their half-hearted efforts and feared that Hungary would repeat Romania's previous sudden defection to the Allied side, so in October 1944 he occupied the country and replaced Horthy's government with a Nazi-like Nyilas regime. The occupation was bitter for the Magyars as they watched the Germans confiscate everything worthwhile.

Worse was to come, however, as the Russians drove the Germans back across Hungary to the city of Budapest. Here Hitler ordered a fight to the finish and for 42 days the city withstood the siege by Voroshilov's Mongols from the East and by Tobulkin's army coming up from the South. During this time the city was ceaselessly bombarded by artillery, bombed by Anglo-American Air Forces and conquered, street by street and house by house, by the Russians. It never surrendered. As the Germans withdrew they took with them everything of value that was transportable, and whatever was left was taken over by the Russians. The city had been demolished. This fanatic resistence by the stubborn Germans and allied Hungarian troops kept Hungary in the War until the bitter end, a fact that militated against the Magyars in the later peace discussions. Insufficient time has passed and knowledge accumulated for a proper perspective in assigning Horthy's government its proper place in history. How much were they pressured by Hitler into the actions that they took? What were the alternatives and their possible consequences? Could they have done otherwise? Regardless of the verdict, Hungary was devastated.

It was at this point in her troubled history that I arrived in Budapest at 10:00 A.M. on the fourteenth of August 1945. Russia had entered the war against Japan on July

27 and Japan surrendered two weeks later. It was cause and effect as far as the Russian soldiers were concerned and I met none below the highest rank who had even heard that we had been battling the Japs for three years. I am sure that they did not believe my statement that such was the case.

My arrival in Budapest was not all clear sailing. In the first place there was a three weeks' delay in departure from Italy awaiting Russian clearance for me to enter Hungary. Secondly, on arrival I was detained six hours on the plane because on my identification card my name was correctly spelled Shack*el*ford while on the application for clearance previously forwarded to them it was incorrectly spelled Shack*le*ford. The typographical error apparently called for a decision of higher authorities, and since Russians do not arrive at their offices until midday (but they work until late at night) the delay was understandable. During this delay and when finally cleared, the Russian officials were very friendly. The experience taught me that they were sticklers for protocol and preciseness on the part of others, but later events proved that this did not apply to themselves.

But to go back a little in time. As soon as the Russian army entered Hungary (Nov. 1944) they set up a provisional government in the Hungarian town of Debrecen. As would be expected the key appointees were communists, many of whom were former refugees from Hungary and Soviet-trained for the job, holding dual Russo-Hungarian citizenship. At the same time the Allied Control Commission for Hungary was formed, consisting of a representative with his staff each from Russia, Great Britain, and the United States. The Russian member was Marshall Voroshilov (now president of the U.S.S.R.), who turned out to be far easier to get along with than most Russian high officials (later he was out of Hungary a great deal and his deputy was Lt. Gen. Svirodov, a good looking, well-groomed officer of apparently above-average breeding); the Britisher was Brigadier General Edgecombe who had a good sense of humor; and the American was Major General William S. Key, a powerful athletic figure of a man who obviously kept in good physical condition, was a very successful oil man in private life, possessed a hearty laugh, good singing voice and friendly personality and could be extremely firm on a point without being offensive. He never exaggerated but whatever he said they knew he meant. All characteristics that they admire. General Key was more highly respected and better liked by the Russians than any other American or British officer I saw in contact with them, but, as will be seen, it takes more than personal respect and popularity to accomplish things with the Soviets—*it takes force*, and that is what the Anglo-Americans did not have. Voroshilov had between one and two million Russian soldiers in Hungary; Edgecombe and Key each had a dozen or so officers and men at Debrecen, later increased to 15 officers (of whom I was one) and 55 enlisted men in Budapest.

The function of the Allied Control Commission was to run Hungary until an acceptable and stable government could be established, and then to supervise that government (tell them what they could and could not do) until after the peace treaties had been signed. However the rules of the Commission designated the Russian to be chairman with complete authority to make decisions regardless of whether he held the minority of majority opinion. I often thought it would have been better named the "Russian Control Commission of Hungary" with associated and unwelcomed American and British observers. All Russian decisions were then put forth over the signature of the Allied Control Commission implying that the Anglo-Americans agreed, although in most instances they disagreed violently. This was extremely unfortunate and I believe was the largest factor that contributed to America's rapid loss in popularity in East Europe. Repeatedly Hungarians and Romanians pointed out to me that some unpopular move must have been sanctioned by either the U.S. or Britain or both, as otherwise the Russian would have been a minority in the Commission vote, and my explanation was too incredible for them to believe.

The first major action of the Provisional Government, established in Debrecen, was the new Land Reform Act. As the Russian armies penetrated deeper into Hungary the Provisional Government took over the captured latifundia and divided them in 15 acre lots among the local peasantry. The idea was very popular at first and converted many peasants to the communist side until they were disillusioned to find that the politically active communist received the choice parcels; that excessively large proportion of their produce was requisitioned by the government; that an effort was being made to force them into collectivism which they did not want; and that it was difficult to farm without tools or work animals, which they lacked. These facts aroused later hostility against the communists.

After the fall of Budapest the Provisional Gov-

ernment and Allied Control Commission moved to Budapest where I joined them after the war had ended and the armistice had been signed.

One of the armistice terms stated that a free and un-influenced election of a democratic government would be held in Hungary at the earliest possible moment. The election date was set for early October 1945. Since the early twenties, in Hungary there existed the Smallholder Party made up in the most part of independent businessmen and farmers who believed in individual initiative and less usurpation of power by the state. Their ideas most closely approximated the democracy practiced in the U. S., and were middle of the road as compared to the Communists and Socialists on the left and Royalists on the right. In the pre-election campaign the Communists were favored by greater allotment of radio time, newsprint for their newspapers, and the use of Russian army trucks (mostly lend-lease American made) to transport voters to Communist meetings (on election day, Communist voters to the polls). This last was particularly important as there was no other means of transportation at that time and the Smallholders had to walk, often great distances, to their meetings and on election-day to the polls. An additional effort to influence the voters toward communism was made by Russia which took unilateral action in recognizing the provisional Communist Hungarian government on 25 Sept., 1945, twelve days before the scheduled election. This implied that a Communist government would be conqueror Russia's choice and make easier Hungary's terms at the final peace settlement.

The U. S. had made a previous modest propaganda gesture of good will for our type of democracy by returning to Hungary (August 20, 1945) the 1000-year preserved right hand of the famous former Hungarian King and present Saint, St. Stephen. THE DEXTER, as it is called, in its glass, gold and jewelled case, is Hungary's most cherished and holiest relic. It had been removed by the Germans and later captured by the Americans. The date of its return was St. Stephen's day, and before night fall between one and two million people, twenty or more abreast, took nine hours to march past the St. Stephen's Basilica portico where the relic was on display. The marchers were from all walks of life and seemed to be of all religious sects. I had the impression it was a combined nationalist and religious demonstration. They sang the Hungarian anthem as they marched and you could hear the tune all over Budapest that day, it was most impressive. I suspect the Russians thought so too, because the following year a compulsory Communist workers demonstration was staged on St. Stephen's day to avoid its repetition.

Although there was strong procommunist pressure, there was, however, little actual pre-election violence as compared to what took place later in Romania, Bulgaria and Poland. The election was held on Sunday, 7 October, 1945. About seven parties, including the Communist and the Smallholder Party, each put up a full list of candidates for representatives to Parliament and for local municipal and county offices. The election was a free one and went off smoothly and without violence. Other Anglo-American officers and I visited a number of polling places and there was no evidence or reports of any disorder. The next day, to everyone's surprise and the Russians' anger, it was reported that the Smallholder Party had elected 57% of the members of Parliament and 66% of the municipal and county officials. It was an absolute majority. The Communists had polled only 11% of the votes, giving them fourth place in popularity and members elected. The Soviet had learned a bitter lesson. As a result this was the first, and with the exception of Austria, the last free election held in East Europe and with other than a single party slate of candidates.

The Smallholder Party elected their leader Tildy for President, and Ferenc Nagy, another party member, was made Prime-Minister. With their absolute majority and

assumption of the responsibility of the government, they would have been entitled to establish a one-party government, or at least making only token appointments from the other parties. However, the Communist Party was supported by Russia (with its occupation army) in insisting on claiming a larger proportion of official positions than their small minority vote justified. As a result a coalition government was formed with Rákosi, a renegade Hungarian Jew, a Soviet citizen and head of the Communist Party in Hungary, as Deputy Prime-Minister; Rajk (later executed by his own party), another communist as Minister of the Interior which includes control of the whole police system (a powerful position Communists strive for and seem to get in all coalition governments that include communists); Vas, a communist who was made chairman of the all-powerful Supreme Economic Council; and almost half of the local county and city official positions. This sealed the doom of Hungary, as will be seen.

The Smallholder Party assumed the responsibility of government under the most unfavorable auspices. Hungary was a conquered enemy country that could not demand nor expect any favors from any other country in a position to grant them. Budapest was in ruins, its transportation and other public utilities destroyed, not even a fire engine remained with which to fight a fire, should one start. Water and electricity was available in only parts of the city. Winter was coming on and there was no fuel for heat nor glass to repair the broken windows and keep out the cold. Blankets and new clothing were unobtainable. The bridges connecting the twin cities of Buda and Pest were destroyed and only one had been repaired sufficiently to use temporarily. All railroad locomotives and cars, trucks and automobiles, Danube ships and barges had been removed by the Germans and were later captured and held by the Americans in Germany and Austria. All factories had been destroyed and even when rehabilitated 90% of their production went to Russia in payment of their 300 million dollar reparations bill (the U. S. and Britain renounced all their claims for reparations against Hungary).

Those hospitals that were still standing had few beds; no blankets, sheets, gauze for dressings, drugs, anesthetics (except local anesthetics), antiseptics, surgical instruments, heat or food. Only emergency operations were performed and they had to be done under local anesthesia. No chest surgery was done. Iodine was the only antiseptic available and it was in short supply. Newspapers were used for surgical dressings, sanitary napkins, and diapers. There were no meat, sugar, fats, milk, eggs or butter and the city population was literally starving. This was because the live stock and poultry had been stripped from the farms by the Germans and later the Russians. Besides, the crops were ruined, unplanted or unharvested as the armies fought over the land. Even whatever food was produced could not be brought into the city for distribution because there were no transport vehicles.

Starved mothers were unable to produce breast milk for their own babies, and cows' milk was unavailable. The infant mortality rose to 48%. One of my most satisfactory memories is that, by bribing milk-producing mothers with small packets of food each time they made a donation of their milk to a human milk bank, we could store their surplus secretion and persuade them to nurse longer. We then gave this stored human milk to those whose mothers could not produce it, and lowered the infant mortality to 13%. There was no insulin and forty of fifty known diabetics in the town of Zirc died in diabetic coma. Morphine and digitalis were also unobtainable. There was no plaster of Paris, and wooden splints had to be substituted for treating fractures. All x-ray tubes or machines and film had been removed and were unobtainable. The same was true of microscopes, vaccines, sera, laboratory chemicals, apparatus and other equipment.

No western medical or scientific journals had entered Hungary since Hitler invaded Poland September 1, 1939, so antibiotics and the newer advances in medicine and cardiac and thoracic surgery were unknown.

Under these handicaps the Hungarian medical profession worked with amazing efficiency and ability. Elective surgery was postponed in the hope that conditions would be better later, and only emergency or urgent procedures carried out. These were all done under local anesthesia, even such things as a cholecystectomy with exploration of the common duct, or a gastrectomy for peptic ulcer. Thoracic surgery suffered as there was no means of employing endotracheal anesthesia.

Hungarian surgeons used to be among the best in Europe. Pólya is universally remembered for his type of gastrojejunostomy following gastreotomy. He disappeared in the midst of the siege of Budapest. Pólya was a Jew. The anti-jewish Nyilas group (Hungarian Nazis called so after their "arrow" mark), had taken over the government with Hitler's backing when the Germans occupied Hungary to prevent the latter from copying Romania and switching to the Allied side in the war. In the middle of the night (December 23, 1944) Pólya received an urgent call to come to the hospital. He left his home and was never seen or heard of again. That particular night there was a heavy Anglo-American air raid and also bombardment by Russian artillery which may have buried him in the debris. It was also the night that the Nyilas lined up a reported 3000 Jews and other anti-nazis on the bank of the Danube and mowed them down with machine guns, letting their bodies fall in the river whence they disappeared unidentified. Mrs. Pólya and their children later were able to leave the country, and when I last heard two were living in the United States and one in Australia.

In 1945 Ádám was Hungary's most respected surgeon. His name is well known in the United States where he gave papers at several surgical meetings before the war. He was a superb surgeon and a fine character. Although only five feet tall and in his middle sixties, he had fire and determination. He would not join the Communist Party, though pressured to do so. When elected president of the University of Budapest (1946) he was told by the Russian authorities that his inaugural address should refer to the great contributions Soviet Medicine had made to Hungarian Medicine. His straightforward reply was "how can I when they haven't made any?" Someone of lesser standing in the community would have been cashiered but his prestige was too great and he was left alone. Unfortunately he died a year later from cancer. His handsome home was subsequently requisitioned by the Communists to serve as a workers club where his wife is allowed to retain a room.

Frigyesi was the leading gynecologist and had a deserved international reputation. He was president of the Royal Hungarian Medical Society at the time they made me an honorary member, and was a most attractive gentleman with a keen sense of humor. Somehow, despite being well into his seventies, he got hold of a motorcycle, built a closed-in gondola on its rear baggage rack and drove around Budapest behind a boy-driver in this unique contraption. Later when communism gained control of the government, Frigyesi being noncommunist, was arrested and I heard has been deported. The Royal Hungarian Medical Society became the Hungarian Medical Trade Union.

Another famous Hungarian surgeon had disappeared. More than a year later I accidentally ran across him disguised in a small village where, because of his non-communist ideology, he could not practice and apparently made his living by carving and decorating wooden stoppers for wine bottles. I have a few of these stoppers as precious mementoes.

One could list many others in all fields of medicine, surgery and academic life. Suffice it to say that they pitched in and did a heroic and unselfish job in taking care of the sick, restoring the hospitals and university, and improving the health of the country in the first two years of the Coalition Government. However, as time passed, the popularly elected non-communist Smallholders' government was eased out of power and the Communists took over. The ablest men in Hungarian medicine persisted in not joining "the

party," and were displaced from their jobs as professors, heads of clinics, etc., by Communist appointees who were more politicians than doctors. Most of these that I met knew little medicine and less surgery. At the National Institute of Public Health alone 30 of the former non-communist staff that had been trained at the Rockefeller Institute and other western institutions were replaced. This institution had made all the vaccines and sera for the country and for a while were unable to make any because of lack of technical skill on the part of these new appointees. All this at a time when able men were the best resources that Hungary had.

The Medical School of the University reopened and was crowded with students, but there were no facilities and a deteriorating faculty to train them. All teaching was by didactic lectures and there was no research at the time I left. In fact I cannot think of any capable of doing research left in responsible positions, as the appointments were all political.

I must now return to the story of the new government's trials and tribulations. It tackled its gigantic task with vigor but was constantly harassed by the Communists and Russians who made every effort to discredit, harass and destroy it, as will be demonstrated. There was the added burden of supporting the million-man Russian army of occupation.

The Hungarians, even though half starved and inadequately clothed and sheltered were superb in the energetic way they set about cleaning up the litter of war, restoring public utilities, creating housing, constructing three more necessary bridges across the Danube and keeping their gay spirits under the greatest adversity that I have witnessed. My hat is off to them.

The greatest problem was inflation. The pengö had been valued at five to the dollar. When the currency collapsed in August 1946 the pengö was valued at 2,000,000,000,000,000,000 pengöes to the dollar. I am told that this is the most rapid inflation that has ever occurred. It was so fast that at one time we paid our civilian employees twice a day instead of weekly. In the morning (at the prevailing rate) so that they could buy their lunch and again in the evening so they would have the proper amount for dinner. In August 1946 it collapsed completely, and barter became the only medium of exchange. City workers had to exchange something like a coat or pair of shoes or silver or jewelry to buy eggs, etc., from the farmer and vice versa.

The cause for inflation was obvious. The Germans and Russians had taken everything of value out of the country (including the treasury gold backing the pengö) and all production of manufactured goods was stopped by the destruction of the factories. Meanwhile the government was printing paper money without gold, silver or other real backing. In international exchange the money was worth no more than the paper it was printed on, regardless of what the printing said. Hence there was much unbacked money being issued with no goods to buy with it within Hungary while it was not acceptable outside of Hungary. In addition, as factories were rehabilitated, the Russians took 90% of their production as reparations (crediting Hungary with considerably less than the products were worth). This meant that the Hungarians spent their resources but received payment in only 10% of the finished product with which to buy more materials so as to continue producing. America and Britain disclaimed any reparations and pointed out to the Russians that their heavy reparations bill, unless decreased or temporarily deferred, would prevent recovery and make the country a liability instead of an asset. The Russians found inflation useful for their purposes, however, and made no effort to control it. The advantages to them were that it served as useful argument against the Smallholders government who were ostensibly the party in power and could be blamed technically; furthermore it destroyed the independence of the non-communist middle

and upperclasses, removing them as potential opposition leaders.

Some means of re-establishing a stable currency was essential. Accordingly the United States made a generous move by returning to Hungary the 34 tons of gold bullion ($37 million) which the Germans had taken with them from the Hungarian Treasury and which the American army had subsequently captured and held in Frankfurt, Germany. Legally this gold was warloot and we were under no obligation to return it, but it was hoped by so doing that the weakened Tildy government would be strengthened. I took part in arranging the return of the gold and remember that General Lucious Clay in Berlin advised against it as a futile step that would give gold to an eventually Communist government for which the U. S. would receive no credit for its generosity. I thought he was wrong at the time, but subsequent events supported his opinion, as will be disclosed.

On August 6, 1946 the gold was delivered in Budapest, and Ferencz Nagy, the noncommunist Prime-Minister still in power, although only tenuously so, made a radio address thanking the U. S. for its generosity.

The *pengö* was abolished and replaced by the *forint* which was based on the gold reserve and valued at 12 forints to the dollar. The forint was still stable at the time of my final departure from Hungary and some economic progress was being made.

Only a few days after the gold restitution and issue of new currency, Rákosi, the Communist Deputy Prime-Minister, addressed a large gathering of miners and stated that Hungary's inflation had been due to the exorbitant reparations demanded by Great Britain and America (a complete untruth as mentioned above) and only Russia's generosity and firm friendship had made it possible to restore a stable currency. Later in a private informal conversation with one of his colleagues I pointed out this distortion of facts and the communist laughingly replied that facts were a nuisance to be ignored in public propaganda speeches. This statement has helped me to understand much that has been said by Communists since. So far as I am aware Nagy's original speech of thanks was the only public credit that was permitted to be given to the U. S. for the move that saved financial chaos in Hungary. For this I blame the Communists because I personally know that both Nagy and Tildy were most grateful.

The Communists early began sniping away at the Smallholder Party representatives in Parliament and the government. Sixteen of these were removed on the dubiously proven grounds that they had been members of the Nyilas group (I know of many communists, particularly in the police, who had previously been Nazis or Nyilas but were kept in office) and were replaced by Communists. Furthermore, Smallholder Party members were arrested on charges of "black market" dealings (there was no other market at that time) and other trumped up charges (even more applicable to communists), but nothing could be done as the police were controlled by the Communist Minister of Interior. These arrests were always widely published in the press and over the radio with vitriolic attacks against that party. The Smallholder majority in Parliament shrank to where it no longer had a controlling majority and had to compromise with other parties, including the Communists, to pass legislation; meanwhile its party members outside the government were discriminated against or persecuted so that they had to diminish their political activities. In these circumstances the Russians were able to have legislation passed by the Hungarians (thus absolving themselves) that permitted the formation of so-called Russo-Hungarian companies to take over the factories, oil fields, shipping companies, etc., as they were restored, in other words, to take over Hungarian industry.

Foreign-owned companies were later included on the grounds that they had been operated by the Germans (forcibly during their military occupation) and therefore were German war-assets to which they were entitled. (The same Russian definition of German assets is what is holding up the

signing of the Austrian peace treaty. Anglo-Americans maintain that a business taken over by force by the Germans is not their asset, but still they are the rightful owners.) One of the oil companies had been developed, run and owned by the American Standard Oil Company. For the first few years the Russians had the Americans run it but they took the oil and paid way under the market price for it. Later they took over the running of it and pumped the oil out in their own wasteful way. When the American company officials protested, they were excluded from even visiting their own oil field. Paul Reudeman and his former prizefighter associate were not giving up that easily, though, and publicized internationally what was going on. (The Communists countered by imprisoning and "brainwashing" them as reported in the press about 1948. They were the first American citizens so treated.) Hungarian citizens who protested confiscation and the illegal advance of communism were even more badly treated. A reign of police terror was beginning with people disappearing, no public trials or writ of Habeas Corpus. It became worse after the Communists took over the government in 1948.

In early 1946 living conditions were so bad in Hungary that it became obvious that unless some help was given the country could not survive as an independent state. Even though it was branded as an enemy nation and therefore technically ineligible for UNRRA assistance, Mr. Schoenfeld, the able American Minister in Budapest, and General Key, of the Allied Control Commission, vigorously requested and obtained an UNRRA (United Nations Rehabilitation and Reconstruction Assistance) allocation of $4 million to Hungary. Stanley Sommers, a Hungarian speaking American with a staff of Americans and English men and women arrived in Budapest in the spring of 1946 to survey the needs and order and distribute the supplies. It was an able, efficient and remarkably fair-minded group. The American army assigned me to be their advisor on medical and University needs, while the Russian army assigned Colonel Ivan Zvolinski of their Corps of Engineers as an adviser in his field. He was from Leningrad and a most likable and fair-minded fellow. The government was still non-communist but the Communists were rapidly gaining control. UNRRA quickly brought in fats, sugars, milk, canned meats, some of the medical supplies needed as described above, trucks to serve as transport, etc., but then came the squabble over its distribution. The leftists wanted the miners and other heavy workers (all well-communized) to receive larger rations than other (non-communized) groups, and used the reasonable argument that their heavier work required a higher calorie intake (but not as much higher as they stated). Sommers was firm and we called in two nutrition teams from the American army in Germany who made a quick spot-check survey and gave us a factual estimate of how much that increase should be.

All in all UNRRA's relief distribution was a fair one. It may be true that some of these supplies got into Russian hands since they had about a million men occupying and being supported by Hungary, but the abuse was not widespread enough to be flagrant. Relief items such as food, clothing and medical supplies, were not the only things brought in. Seed for planting, live-stock for breeding, chemicals for synthesizing, machinery for manufacturing and trucks for transporting were given to help rehabilitate the country. Over 60% of UNRRA's expenditures were provided by the U.S. There have been many criticisms of UNRRA and its methods, but from what I saw of it in Hungary, it did a good job.

Due to continued harassment by the Communist portion of the Coalition, and the reduction of its parliamentary representatives by disqualification or arrests for various dubious reasons, the Tildy-Nagy Government wobbled along, weathered several crises, and were making progress in rehabilitating the country.

The Paris Peace Conference took place in August, September and October 1946 and I had an opportunity to witness parts of it. The results of this conference sealed the doom of a non-communist government in Hungary. Here are my reasons for saying so:

1. Russia had taken and kept the former Romanian territory of Bessarabia, and as a "sop" to prevent antagonism to

Romania (which had violated the armistice agreement to have an early election) backed Romania's claim to take Transylvania from not-as-yet communized Hungary. A lesson on what happens to those that do not vote communist. The loss of Transylvania meant the loss to Hungary of a territory nearly equal in size to the country itself, a territory rich in agriculture, coal, iron and Hungary's only source of salt and wood, plus two million Hungarians, a University, several important towns and possible uranium deposits.

2. Russia supported Communist Yugoslavia in her claim for a sizable strip of Hungarian land containing mines along their common border.
3. She supported communist-leaning Czechoslovakia in her claim for Hungarian mining territory along their common border, and further, that 200,000 Hungarians be forcibly removed from this territory. To fully appreciate the audacity of this claim, one should recall that a Slovak army marched into Poland with Hitler on the opening day of the war.
4. Russia also presented a reparations bill to Hungary for $300 million as well as announced the taking over of her only two remaining resources, bauxite and oil.
5. (It should also be remembered that Russia supported ex-enemy and now Communist Bulgaria in her territorial claim for part of non-communist Greece, and backed Communist Yugoslavia against non-communist Italy for the possession of Trieste). It was obvious that Russia would support the claim of any Communist regime against a non-communist one, regardless of its justification.

Gyöngyös, the non-communist Hungarian foreign minister pleaded for the retention of at least part of Transylvania, lessening of the reparations amount, and minority rights for Hungarians in Slovakia. The only support he received was when Willard Thorp of the U.S. delegation ably but unsuccessfully attempted to have the reparations bill reduced from $300 to $200 million and when General Bedell Smith, also of the U.S. obtained a 15 to 6 favorable vote on preventing forcible ejection of Hungarians from Slovakian territory. The final decisions rested with a later meeting of the "big four" foreign ministers.

At that time (November 26, 1946) I wrote a public letter to an American newspaper, a copy of which I have before me and part of which will be quoted:

> "The final treaty will be crucially important to Hungary's future. If all the demands of her hostile neighbors are granted the present government will be discredited and forced to resign by public opinion, with a strong likelihood of its being replaced by a Communist one. If such takes place she will become another Russian satellite with her western connections completely severed. If this occurs it will be against the wishes of the overwhelming majority of her people and end the identity of the Magyar nation.
>
> "If the treaty is modified so that the burdens and penalties are not impossible for this small and depleted country, the highly capable and civilized Hungarians can establish a true democracy and with their exceptional intelligence and organizing ability again develop a standard of living for their people that will be equal or better than that of any of the Central European States.
>
> "It is to be hoped that the international authorities will agree on the latter and save a talented people from servility and oblivion."

This was not done and the events that have taken place since my departure from that country are as well known to the reader as to me. I have forgotten their sequence but they were somewhat as follows:

The Communists pointed out the inefficacy of the Tildy-Nagy non-communist government in obtaining better peace terms, and thus discredited them. Tildy's son was accused and (I believe but am not sure) executed for alleged "black market" financial dealings, whether justly so I do not know. Nagy left the country on business, was warned not to return as he had been accused of the certainly unique charge of conspiring against the government, of which he was

already the head, and escaped to the U.S. with his family. The Smallholders Coalition government was replaced by a Communist one, and the party itself disintegrated. The only organized opposition to communism that remained was the Catholic Church with Cardinal Mindszenty as their spokesman. This doughty, stubborn and possibly ill-advised but courageous former peasant continued to oppose communism by pastoral letters. His tactics were no more criminal or revolutionary than those of any Democrat attacking the Republican administration in the U.S. However, he was an opposition leader and had to be destroyed. He was arrested, "brain washed," tried and sentenced as the world knows.

Hungary is now communized and a Russian satellite. They deserved a better fate.

I should like to close with another quotation from my letter of November 26, 1946.

"The Slavic (Russian) cry against British and American imperialism is a farce when one considers that Russia has acquired Esthonia, Latvia, Lithuania, Bessarabia, parts of Poland, Finland and Sakhalin with claims on the Dardanelles and Tunis, while England has given up India and Egypt, and America the Philippines, during and since this war (World War II), not to forget the expansion of Russian-dominated Poland, Bulgaria, Romania, Yugoslavia and Czechoslovakia, while the pro-western countries of Italy, Austria and Greece have been reduced in size." Add to these Red China, part of Indo-China and Korea. *"These facts,* to the writer, *are irrefutable evidence of the policy of Communist Imperialism and are more convincing than any number of words and promises to the contrary."*

Late News

Three colonels of the Army Medical Corps have been nominated to be brigadier generals: Colonel John Bohlender, Commanding Officer, Tripler Army Hospital, Hawaii; Colonel Harold W. Glattly, Surgeon, First Army Area, Fort Jay, N.Y.; Colonel John R. Wood, Commandant, Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D.C.

EDITORIALS

Viral Hepatitis

VIRAL HEPATITIS is a disease of major importance in this country. Its recognition is extremely important since the activity of the patient must be curtailed to afford the most favorable situation for combating the infection. This is not a disease in which the patient should be ambulant. Other names have been given to the disease over a period of years, such as, infectious jaundice, infectious hepatitis, catarrhal jaundice, and, in some specific instances, serum hepatitis. The preferred term now appears to be *viral hepatitis.*

This disease is by no means a new one. It has been known for ages. Our Father of Medicine, Hippocrates, mentioned it. In wars it has been one of the prominent causes of morbidity. Our Civil War, World War II, and the Korean Conflict had many cases of hepatitis. And now we have it as a prominent disease among civilians. In 1954 there were 50,000 cases in the United States; a higher number than attributed to poliomyelitis of which we have heard so much recently.

Encouraging, however, are the reports that are coming in thus far this year. These reports show about fifty percent of the number of cases for the corresponding period in 1954. Even so the incidence is still higher than for poliomyelitis.

While much study has been given to the disease, its virus, its prevention, and its specific treatment has evaded the experts. However, we can say that more is known about the disease now because of those studies. We know now that an insidious onset frequently occurs; that icterus is not necessarily a concomitant sign upon which to be alerted; that the degree of icterus does not necessarily tell us of the severity of the disease. Thus doctors must be on the guard. They must keep viral hepatitis in mind at all times, and especially when the patient presents a baffling, persistent problem to them.

There are comparatively simple tests which can be applied in the doctor's own office that will make him strongly suspicious of the presence of viral hepatitis in the patient. More complicated tests can be employed to confirm the diagnosis, but with the suspicion of the disease in the doctor's mind he can do one thing—put the patient to bed, and this early if he will be on guard.

Recently there has been published a booklet which condenses the important information which a physician should know. This booklet has been written by Dr. Heinz F. Eichenwald, Chief, Hepatitis Investigations Unit, of the Communicable Disease Center, Public Health Service, at Atlanta, Georgia. These 58 pages are packed with information which is needed in the management of viral hepatitis. We recommend the purchase of this booklet (Cat. No. FS 2.2:H 41). It can be procured for 55¢ (cash or money order) from the Superintendent of Documents, Government Printing Office, Washington 24, D.C.

Male Nurses

REPRESENTATIVE Frances P. Bolton of Ohio has again introduced a bill to authorize the appointment of male nurses as Reserve Officers. Contrary to its position in past years, the Defense Department has in this instance indicated it favors the proposed legislation.

In many areas of military need, the male nurse is preferable to the woman, who must

have separate quarters, provision for certain minimum "luxuries," and who, in our Western concept of chivalry, must be utilized only in areas where she is not exposed to the possibility of capture and subsequent indignity at the hands of an enemy. Current military thinking calls for a revision of tactical doctrine to eliminate the division front and substitute highly mobile striking forces dispersed over larger areas to deter the use of atomic weapons and minimize their effect, if used. These forces must be self-sufficient units, with organic medical support. It is inconceivable that our leadership would permit the assignment of female nurses to such guerrilla-type forces. The army is presently staffing its newly-revised Field Hospital, intended for direct combat support, with male Clinical Technicians in lieu of the Army Nurse. Carrying this a step farther and providing commissioned male nurses is a natural and logical conclusion for all the Armed Forces.

In any area, however isolated or undesirable, the male nurse can serve in the capacity for which he was trained. This applies to both combat and non-combat areas. No greater preparation need be made for him than for any other officer or soldier. Commissioning men nurses might very well provide a stimulus for additional careers in nursing for men, particularly among those men now serving in the Armed Forces as enlisted technicians. Many could be expected to take up this training and re-enter the service as male nurses. This would in part relieve the existing problem of nurse procurement. We could also expect the male nurse to be a long-term career officer, while those who merely fulfill their obligated two-year service would constitute a readily recallable reserve, where so many of the World War II and Korea nurses have acquired family obligations, or are otherwise disqualified for immediate active duty in a future emergeney.

There will undoubtedly be those who will oppose this measure to give equal rights to the men nurses. Some may say that tender loving care cannot be given by the male of the species. We cannot, however, envision any logical opposition. There is no more logical place for the male nurse than in the Armed Forces.

Mrs. Bolton's bill should receive a thorough study, and, in our opinion, deserves enactment into law.

Secretary Hobby Resigns

Mrs. Oveta Culp Hobby, Secretary of Health, Education, and Welfare, had this to say at the time of her resignation from President Eisenhower's Cabinet: "Serving the Government of the United States is a singular opportunity. No work is so rewarding to the individual or so continually challenging. To practice and cherish public service as a people is to be a free people."

She has been succeeded by Undersecretary of the Treasury Marion B. Folsom.

Around the World

By
CLAUDIUS F. MAYER, M.D.

NIGERIA is one of the tropical countries where *protein malnutrition* has been a major cause of death and disability. The disease was recognized around 1944 and has been variously called malignant malnutrition, fatty liver disease, "diboba," and "*kwashiorkor.*" Recent studies at the hospitals of the University College of Ibadan show that it is common among the Nigerians, among poor and wealthy, male and female, adults and children alike. In its acute form, the disease appears as the *anemia of* pregnant Nigerian women, while in its chronic form it enlarges the liver and spleen of children and adult males, causes ascites and edema, changes the quality of cells in bone marrow to predominantly macronormoblastic, and swells the male breast to look like that of a woman (gynecomastia).

Medical travelers in this part of Africa assert that the *native cassava diet* and certain popular dietary taboos are more to blame for the widespread malnourishment than the social and economic conditions of the land. In Western Nigeria, it is taboo, for instance, to eat eggs though hens are numerous around the native households. The lack of protein is doubly detrimental to the pregnant, especially to those who bear twins, which occurs more often in Africans and in Africa than anywhere else in the world. Thus, a few years ago (1952) *the frequency of twinning* in Rhodesia was reported 1 for every 35 births. At Ibadan, a rapidly growing town of about 200,000 inhabitants, in 1,000 consecutive hospital deliveries the twinning occurred as the rate of 1 in 20 (1953 figure). Most mothers of twins are, of course, anemic as a result of the staple low-protein diet. Indeed, the bearing of twins imposes a greater risk to the mother's health than does a single pregnancy. No wonder that according to the Nigerian belief *twins bring evil spirits,* and an elaborate ritual must follow their birth. Two wooden idols are commonly made, into which it is hoped the spirits will enter before they would have time to harm the mother and the babies.

The exact *nature of kwashiorkor* is still unknown. Some believe that the disease is due not so much to the absence of an essential food factor as to the presence of toxic agents. A Glasgow scholar reasoned that kwashiorkor of breast-fed infants must be caused by the poisonous substances known as Senecio alkaloids. These are present in many African plants which the Negroes use for food. These alkaloids are established hepatic poisons, and can be secreted in the breast-milk.

Nutritional problems in African countries were the topics of many recent discussions. Not so long ago (late 1954) there was published the report of the 2nd InterAfrican Conference on Nutrition, held in West Africa in 1952. Other groups to guide the Africans in their dietary habits are the Commission for Technical Cooperation in Africa South of Sahara, and the Joint FAO/WHO Expert Nutrition Committee. Of course, the center of their interest remains the widespread chronic protein malnutrition.

Africa also exhibits many other interesting *obscure tropical diseases* such as the endomyocardial fibrosis in Uganda, the idiopathic thrombophlebitis in Rhodesia, the tropical ulcer and pyomyositis, the keratoconjunctivitis of the Bantu, the chronic parotitis, the Uganda type of nephrotic syndrome, etc. Thus, the *study of Africans* is made more attractive for those devoted to geopathology and geomedicine. The term "tropical disease" is perhaps improperly applied to most of these ailments. Formerly, no doubt, many tropical diseases had been also common to cold countries. Modern nutritional studies make it also probable that

these very diseases disappeared from the cold regions as a result of better food, improved economic conditions, and better sanitation.

For some time the attention of the British Commonwealth of nations has been concentrated on the *subject of mental health*. Interested people gathered at various points of the world to discuss related problems. Just a year ago (Aug., 1954) an international congress was active in Toronto where three symposia dealt with mental health and child development, industrial mental health and human relations, and alcoholism. They unanimously agreed that true mental health can be attained only through a life which holds some meaning and purpose beyond the purely material. It was also then announced that more latent mental instability is brought to surface by marriage than by war.

As an aftermath of these congresses people everywhere began to worry anew about the *effect of "comics."* Last October the horror comics finally arrived at the British Parliament, also at the editorial desk of the British Medical Journal. An entire page of the journal sampled the text and the style of the horror products, and another column castigated the British public for tolerating such abominable, "obscene" (as defined by Oxford English Dictionary) misuse of wood-pulp. A member of Parliament demanded that the law relating to obscenity in literature be amended to cover also this type of publication. Leading to some confusion, the *Daily Telegraph* of London stated that 60-70 million copies of the comics are sold monthly in the U. S. The British Medical Association sent its appeal to the family doctors who should not remain indifferent to the attempts of undermining the mental health of the youth of Great Britain, while a deputation headed by the Archbishop of Canterbury, petitioned the Home Secretary in the same direction. By the way, since 1953 a *Comics Campaign Council* has been working in England as a section of the National Committee for the Defence of Children. This year the Council began to publish a 3-pence bulletin (another comic!? or countercomic!?) as a new weapon in the intellectual battle.

On this side of the Atlantic, several medical men and educators recently called attention to the effect of the different categories of comic "juvenile" literature. Thus, not so long ago an editorial of a leading American medical journal remarked that banning comic books and blaming parents is too easy and fruitless a way out of *the problem of juvenile delinquency*. Home life should be more democratic and less authoritarian; there should be more cooperation than compulsion (according the editorial). A U. S. educator also recommended that parents should plan balanced programs of recreation with time for children to read comic books and see TV shows. Meanwhile, the *European medical campaign against the "comics"* has now spread to Germany where a recent joint resolution of the German Pediatric and Child Psychiatric Societies condemned this form of juvenile education. . . . *Multa Paucis!*

SUSTAINING MEMBERS

It is a privilege to list the firms who have joined The Association of Military Surgeons as Sustaining Members. We gratefully acknowledge their support.

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To Our Members

Washington, D.C.
August 1, 1955

DEAR MEMBER:

Have YOU mailed your application for our Health and Accident Plan? If you have, we congratulate you.

If you haven't, you will be interested in knowing that many of our members have taken advantage of this outstanding group disability program that is being sponsored by your Association for your benefit. It's a matter of record, too, that it was well worth their while to slip their completed application with their check into an envelope addressed to our Association Service Office located at 1500 Walnut Street in Philadelphia. Although this program has only been in effect since the fifteenth of August of last year, claims are constantly being processed in the Association Service Office for members living throughout the United States and its territories. While a portion of these claims are for relatively minor accidents or illnesses, some of our less fortunate members whose disabilities were of a more serious nature have received payments totaling thousands of dollars for prolonged periods of disablement. Needless to say, these payments are proving of great assistance to these members in time of financial need.

It is interesting to note that while the smallest claim settled during this first year was in the amount of $28.57, it was the only claim that has been paid that amounted to less than $100.00. The average of the claims paid to date amounts to $457.48, while the largest single benefit paid thus far to a member was in the sum of $2,614.28.

Mention must be made of the appreciation expressed by the Association Service Office to those members who have applied for benefits. The expeditious processing of their claims is due, in large measure, to the fact that their applications for such benefits have been carefully and completely executed. This factor has eliminated to a great extent both the necessity for writing to secure additional necessary information pertaining to a claim and the loss of time invariably involved.

In spite of the fact that claims are being processed continually, the loss ratio of this plan has been good and the insurance company has expressed its complete satisfaction with all of the aspects involved in its administration.

We are gratified that this program has been of so much aid to so many of our members who suffered disabilities during the past year. We only regret that this valuable protection could not be extended to the members who applied, but who were declined because of inadequate participation on the part of the membership as a whole. We particularly wish to assure them that continued effort is being made to qualify this plan for the Association so that coverage may be extended to *ALL* eligible members in a civilian status who desire it, regardless of past medical history.

We wish, too, that the other members of the Association who incurred disabilities during this past year had had the protection of this plan. We know that many of them failed to submit their application through oversight, or, perhaps, procrastination. Had they joined, not only would they have had the benefits of the generous provisions of this plan, but it is likely that their participation would have made it possible for others to benefit as well, and the more members who participate, the stronger the program becomes.

Remember, this is *Your* plan. It is one of the best group Accident and Health programs available. It deserves your support. You need its protection. Write today to our Association Service Office for complete details:

Association of Military Surgeons of the U. S.
Association Service Office
Suite 914, 1500 Walnut Street
Philadelphia 2, Pa.

Sincerely,
ROBERT E. BITNER
COLONEL, U. S. ARMY, RET.
Secretary

ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3d of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.

Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

TRANSFERRED TO DR. BERRY'S OFFICE

Colonel Robert J. Benford, USAF (MC), editor of the *United States Armed Forces Medical Journal*, for the past two years, was assigned to the office of the Assistant Secretary of Defense (Health and Medical) on July 1. Colonel Benford is editor of the *Journal of Aviation Medicine* and author of a recently published history of the Aero Medical Association, "Doctors in the Sky." He is a member of the Advisory Editorial Boards of MILITARY MEDICINE and the *Areonautical Engineering Review.*

PLANNING COUNCIL

A four-man Health and Medical Planning Council has been established by the Department of Defense. The purpose of the council is to eliminate overlapping and duplication in health and medical services in the Armed Forces. Area responsibility for medical care, joint staffing of hospitals, dependent medical care, and doctor training will be some of the problems to be considered by the council.

DEPENDENT MEDICAL CARE

There will be a drastic curtailment of medical care for the dependents of personnel of the Armed Forces. This has come about because of the shortage of personnel, and the failure to provide alternate measures such as group insurance or medical allowances.

GOVERNMENT RESEARCH

The Hoover Commission recently submitted to the Congress its report on Research and Development in Government. While it recognizes the ceaseless efforts of the Government in increasing productivity and thus strengthening national defense, it feels it necessary to urge that "greater Federal support be given to basic and medical research." The Commission went along with many recommendations which its "Kelly" task force (called so after Mervin J. Kelly, president of the Bell Telephone Laboratories, who was the chairman of this particular subcommittee) had suggested for the improvement of administrative practices in government research.

The task force found that the Armed Services are not sufficiently daring and imaginative in their approach to new weapons and weapon systems. Periodical canvassing of the field of new scientific knowledge was thought to be sufficiently thought-provoking for the initiation of new projects, provided that it would be carried out by an authoritative standing committee appointed by Assistant Secretary of Research and Development in the Defense Department.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYES

Deputy Surg. Gen.—BRIG. GEN. JAMES P. COONEY

MASS CASUALTIES COURSE

The course on the medical care of atomic casualties which has been given at the Walter Reed Army Medical Center for the past several years will be given six times this fiscal year instead of four times as previously scheduled.

This is being done to meet the greatly increased demand from civilian physicians throughout the country for admission to the sessions. The material used is unclassified.

A strict quota is maintained under an allotment system and physicians or other qualified professional personnel must make their applications through their respective affiliations, such as the American Medical Association, professional schools, and the various government services. Reserve officers must apply through the chief of their districts.

Dates set for the courses are: December 5-14; January 30-February 8; March 19-28; and June 4-13. Other dates have been filled.

ASSIGNMENTS

Maj. General Alvin L. Gorby, who has been Deputy Commanding General of the Walter Reed Army Medical Center has been assigned to the U. S. Army Forces in Europe as Surgeon, effective in September. He will relieve Maj. General Joseph I. Martin who will return to the United States and is scheduled for retirement the latter part of this year.

Brig. General Louis H. Ginn, who has been Commanding General of the Medical Replacement Training Center, Brooke Army Medical Center, Fort Sam Houston, Texas has been assigned to Headquarters, Fourth Army, Fort Sam Houston. He will succeed Colonel John Bohlender, who becomes Commanding Officer of Tripler Army Hospital.

Colonel Joseph H. McNinch, MC, was appointed Chief of the Personnel Division, Office of the Surgeon General, to succeed Colonel Harold W. Glattly. Colonel McNinch was formerly commander of the Army Environmental Health Laboratory, Army Chemical Center, Maryland.

Colonel Harold Glattly, MC, who has been Chief of the Personnel Division, Office of the Surgeon General, has been transferred to Headquarters, First Army.

Colonel Robert L. Callison, MC, has been appointed Chief of the Preventive Medicine Division, Office of the Surgeon General. Colonel Callison received his Master's degree in Public Health from Harvard University School of Public Health, and is certified as a diplomate by the American Board of Preventive Medicine and Public Health. For the past two years he has headed the Environmental Control and Sanitation Branch of the Preventive Medicine Division.

Colonel Charles O. Bruce, MC, has been assigned as Health Director of the Panama Canal Zone Government. He has been senior military assistant to the Secretary of the Army for the past two years. Colonel Bruce received the degree of master of public health from Johns Hopkins University in 1949 and has had several courses in tropical medicine.

Lt. Colonel Edward J. Dehne, former Chief of Preventive Medicine, U. S. Army, Caribbean, has been assigned as head of the Army Environmental Health Laboratory at the Army Chemical Center, Maryland. He succeeded Colonel Joseph H. McNinch who was transferred to the Office of the Surgeon General as Chief of the Personnel Division. Colonel Dehne received the Master of Public Health degree in 1941, and Doctor of Public Health degree this year, both from Johns Hopkins University School of Medicine. He is a Diplomate of the American Board of Preventive Medicine, and Fellow of the American College of Preventive Medicine.

Lt. Col. Herschel E. Griffin, MC, has been assigned as chief of the immunization section, Infectious Disease Control Branch, Preventive Medicine Division, Office of the Surgeon General. He succeeds Major John D. Lawson.

Colonel Griffin was formerly a research instructor in preventive medicine at Walter Reed Army Medical Center.

Lt. Col. Harry J. Adams, MSC, has been appointed Chief of Social Services, Office of the Surgeon General. He succeeds Major Barbara Hodges, MSC, who reverted to inactive duty status. He will be responsible for medical and psychiatric social work activities conducted in the Army's hospitals, training centers and disciplinary barracks.

He is a member of the American Association of Social Workers and the National Conference of Social Work.

Major Willis L. Frederickson, MSC, has assumed duties in the Office of the Surgeon General as chief, administrative office, research and development division. He replaces Major Jesse W. West.

DEPUTY COMMANDER, WALTER REED

Colonel Francis W. Pruitt, MC, was appointed Deputy Commander of Walter Reed Army Hospital, of which Maj. General Leonard D. Heaton is Commanding General, Colonel Pruitt will continue to serve as Chief of the Medical Service of the hospital.

NEW EYE CHIEF AT WALTER REED

Colonel William L. Spaulding has assumed the duties as Chief of the Ophthalmology Service at Walter Reed Army Hospital. He replaces Colonel John J. King, Jr., who has left the military service for private practice in Washington, D.C. Colonel Spaulding is a Diplomate of the American Board of Ophthalmology, and a Fellow of the American College of Surgeons, International College of Surgeons, and the American Academy of Ophthalmology.

PEDIATRIC CHIEF HONORED

Colonel Ogden C. Bruton, Chief of the Pediatric Service, Walter Reed Army Hospital, has been elected to membership in the American Pediatric Society, a group composed of leading research and teaching pediatricians in the United States.

Colonel Bruton recognized and described a new disease, agammaglobulinemia, in 1951 and has made many other contributions in the field of pediatrics. In addition to his military duties he is assistant clinical professor of pediatrics at Georgetown University School of Medicine and consulting pediatrician at Children's Hospital, Washington, D.C.

AWARDS

Colonel Thomas N. Page, formerly Third Army Surgeon now Chief, Medical Plans and Operations Division, Office of the Surgeon General, was recently appointed by the Queen of England as "Honorary Commander of the Most Excellent Order of the British Empire in recognition of his services to the cause of the United Nations during the hostilities in Korea" where he served as Eighth Army Surgeon. The presentation was made by the British Ambassador during ceremonies in Washington.

Colonel Ruby G. Bradley, ANC, Chief, Nursing Service, Third Army, was awarded the Florence Nightingale Medal at the international session of the American National Red Cross Convention in Atlantic City. Colonel Bradley will be remembered as one of the nurses on Bataan during the Japanese invasion of the Philippines. She was taken prisoner. During the Korean Conflict she served with the 171st Evacuation Hospital and was later Chief of the Nursing Service of the Eighth Army. Colonel Bradley is the fourth nurse of the Army Nurse Corps to receive this honor.

RECEIVES MACEACHERN AWARD

Major Dan G. Kadrovach, MSC, one of the 46 graduates from the Northwestern University course in Hospital Administration not only received his master's degree in hospital administration but also won the Malcolm T. MacEachern prize consisting of $250 cash award and a silver medal. This prize is given by the Johnson & Johnson Research Foundation to the "student who has completed the program with highest academic standing and who, in the opinion of the faculty, shows unusual promise of achievement in the profession of hospital administration."

SKINNER MEDAL AWARD

First Lieutenant Gaylord S. Knox, MC, was awarded the Skinner Medal for the highest scholastic rating in the basic military course at the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

Lieutenant Knox received his pre-medical education at Ohio State University and his medical degree from Tulane University School of Medicine. He entered the Army in 1953.

TO CAMP GORDON, GEORGIA

Colonel Harry E. Ramsey, who has been Dental Surgeon at Fort Devens, Mass., for over three years has been transferred to the Army Training Center at Camp Gordon, Georgia.

He was Eighth Army Dental Surgeon in Korea prior to his assignment to the Fort Devens station. While at this latter station Colonel Ramsey has been active in dental affiairs in Middlesex and Worchester counties and has been honored for his participation and contributions to the dental profession in Massachusetts.

MPH DEGREES

Two Veterinary Corps officers, Col. Joseph W. Manges and Lt. Col. W. H. Deiterich, have received the degree of master of public health, the former from Johns Hopkins University, and the latter from the University of Michigan.

Colonel Manges has been assigned to the Medical Field Service School, Fort Sam Houston, Texas, as director of the department of veterinary science.

Colonel Deiterich will head the veterinary division of the medical laboratory at Tripler Hospital.

HOSPITAL ADMINISTRATION GRADUATES

Forty-eight Army and Air Force officers completed 39 weeks of advanced training in hospital administration in June at the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas. Brig. General Paul I. Robinson, MC, Commanding Officer of the Letterman Army Hospital, delivered the graduation address.

Twenty graduates of the course were candidates for the degree of Master of Hospital Administration which is offered through the school's affiliation with Baylor University. They are: Colonel Frederick J. Knoblauch; Lt. Colonels Elwood W. Camp, Albert B. Hunt, Emmett L. Peterson, Leslie E. Starks, Charles E. Tegtmeyer; Majors James F. Allen, Sidney D. Cox, Jr., Clarence W. Edmonds, Ralph G. LeMoon, Garland A. Perry, William L. Plock, Hasty W. Riddle, Winifred G. Riley, Glen B. Wagnon; Captains Leonard Berlow, Helen L. Callentine, Paul L. Deuel, Helen E. King, Rodolfo D. Santos (PI).

RETIRED

Colonel Tom F. Whayne, MC, who has been chief of the Preventive Medicine Division in the Office of the Surgeon General has retired from the Army to become the Professor of Preventive Medicine in the Department of Preventive Medicine and Public Health University of Pennsylvania School of Medicine.

Colonel Seth O. Craft, MSC, executive officer of Brooke Army Hospital, retired in June after 35 years service. He will make his home in Battle Creek, Michigan.

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN

Deputy Sur. Gen.—REAR ADM. BRUCE E. BRADLEY

ADMIRAL PUGH ELECTED

The Military Medical Section of the American Medical Association elected Rear Admiral H. Lamont Pugh, former Surgeon General of the Navy, as chairman of the section at the meeting held in Atlantic City, New Jersey, in June. Admiral Pugh succeeds Doctor I. S. Ravdin, who is John Rhea Barton Professor of Surgery at the University of Pennsylvania School of Medicine.

INDO-CHINA MEDAL AWARDED

The medal "Officier de l'Ordre National de Vietnam" was awarded to LtJG Thomas A. Dooley, MC, USN, for his outstanding work in refugee camps in Northern Vietnam. The award was made by Indo-China President Ngo Dinh Diem at the Presidential Palace in Saigon on May 12.

Early in September 1954 an additional medical officer was needed in the Navy's

L. to R.) LtJG Thomas A. Dooley, MC, USN; Capt. Walter C. Winn, USN, CO Evac. Forces; Father Khue; Maj. N. R. Smith, USMC; President Diem.

Preventive Medicine and Sanitation Unit at the refugee camp in Haiphong. Dr. Dooley, then serving as medical officer of the *USS Montague* (AKA-98), volunteered for the duty. He became Officer in Charge of the Unit on October 24, 1954 and continued as such until the completion of operation "Passage to Freedom" on May 19 of this year. Doctor Dooley is a graduate of Notre Dame and the St. Louis University Medical School.

RESERVE MEDICAL ACTIVE DUTY TRAINING

Special courses of instruction designed to aid in keeping Naval Reserve medical personnel not on active duty abreast of recent advancements in military and naval medicine have been established for fiscal year 1956.

Eligible Naval Reserve medical personnel, including those attached to pay units of the Naval Reserve, are encouraged to take advantage of the opportunity to attend one of these courses in a pay status. Quotas providing for pay and authorized allowances for personnel in a non-drill pay status have been assigned each naval district. Contingent upon non-availability of funds active duty may be performed without pay. Additional detailed information concerning the following FY 1956 courses may be obtained from district commandants:

Seminar for Commanding Officers, Naval Reserve Medical Companies—6 days—Convenes in the Bureau of Medicine and Surgery, Navy Department, Washington, D.C., on October 31, 1955. All Naval districts have been assigned a quota for this seminar.

Medical Military Training—12 days—Will be conducted in the Naval Medical School, National Naval Medical Center, Bethesda, Maryland, October 3-15, 1955, and March 12-24, 1956. Chief, Naval Air Reserve Training; Potomac River Naval Command; and all Naval districts, less 11th, 12th and 13th, have been assigned quotas for officer personnel only.

Insect and Rodent Prevention and Control—14 days—Naval Preventive Medicine Unit No. 1, Naval Air Station, Jacksonville, Florida, will conduct courses commencing the first Wednesday of each month. Chief, Naval Air Reserve Training; Potomac River Naval Command; and all Naval districts, less 11th, 12th and 13th, have been assigned quotas for male officer and enlisted personnel only.

On-the-Job Training in Submarine Medicine—14 days—Will be conducted by the Naval Medical Research Laboratory, Submarine Base, New London, Conn., commencing first Monday in November, 1955, and February and May, 1956. Quotas for Medical and Medical Service Corps officers only have been assigned 1st 3rd, 4th, 5th, 6th, 8th, and 9th Naval districts.

On-the-Job Training in Medical Research—14 days—

(a) Naval Medical Research Laboratory, New London, Conn.—Earliest possible date

FY 1956. Quotas have been assigned 1st and 3rd Naval districts.

(b) Aviation Medical Equipment Laboratory, Naval Air Materiel Center, Phila., Pa.—Earliest possible date FY 1956. Quotas assigned 4th and 5th Naval districts.

(c) Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Quotas assigned 6th and 8th Naval districts.

(d) Diving Unit, Naval Gun Factory, Wash., D.C.—Quota to Potomac River Naval Command only.

(e) Naval Medical Research Unit No. 1, University of California, Berkeley. Quota assigned 12th and 13th Naval districts. Ensigns, 1995, (Medical), who have successfully completed the first year of medical school and who manifest an interest in medical research and development are eligible for on-the-job training in medical research outlined above.

Clinical Clerkship Training—60 days—At Naval hospitals designated by the Chief, Bureau of Medicine and Surgery. Potomac River Naval Command and all Naval districts have been assigned quotas. Eligible are Ensigns, 1995, who have completed at least their second year in medical school. Each officer is eligible for only one tour of this training.

Special Weapons, Isotopes and Military Medicine—5 days—Naval Station, Treasure Island, California.—Course convenes February 27, 1956. Quotas have been assigned 11th, 12th and 13th Naval districts. For male and female officer personnel.

Malariology and Insect Control—14 days—Naval Air Station, Alameda, Calif.—Courses commence first and third Wednesday of each month. Quotas have been assigned 11th, 12th and 13th Naval districts. Male officer and enlisted personnel only.

Field Medicine—14 days—Marine Barracks, Camp Pendleton, Calif.— Course convenes October 10, 1955. Quotas have been assigned 11th, 12th and 13th Naval districts. Male officer and enlisted personnel only.

On-the-Job Training—14 days—Any suitable medical training facility. Reporting date to be arranged between the district commandant trainee and commanding officer of the training facility. Quotas have been assigned all districts. Male and female officer personnel.

SENIOR DENTAL STUDENT PROGRAM

Forty junior dental students will be placed on active duty as Ensigns 1995 during their senior year in dental college. They were selected from a total of 130 who applied from 35 dental schools. Ten more were selected as alternates. The forty students who will participate in this program have agreed to accept a superseding appointment as lieutenant junior grade in the regular Navy.

BOARD DIPLOMATES

Captain W. B. Johnson, DC, Chief of Dental Service, Naval Hospital, Great Lakes, Ill., and Commander H. S. Johnson, DC, Naval Dental Clinic, Camp Pendleton, Calif., have been appointed as Diplomates of the American Board of Oral Surgery.

RETIRED

Capt. Ernest C. Aulls, MC., Grand Island, Fla.; Capt. Caldwell J. Stuart, MC., Washington, Va.; Capt. Francis G. Ulen, DC, 1015 26 Ave., South, St. Petersburg, Fla.; LCDR Dallas E. Billman, MC.; LCDR James A. Mitchell, DC.; Lt. Charles E. Curtis, MSC, 34 Ridgewood Ave., Ridgewood Park, New London, Conn.; Lt. John W. Parsons, MSC, 364 Hanover Ave., Apt. No. 2, Oakland, Calif.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. W. H. POWELL, JR.

SURGEON GENERAL HONORED

Maj. General Dan C. Ogle was the recipient of two high civilian awards during the month of June. He was presented with an Honorary Fellowship in the American College of Chest Physicians and a centennial

citation from Eureka College, Illinois from which he graduated prior to entering the University of Illinois Medical School.

Public Health Service

Surgeon General—LEONARD A. SCHEELE, M.D.
Deputy Surg. Gen.—W. PALMER DEERING, M.D.

ASSIGNMENT

Dr. Carl L. Larson has been appointed as Chief of the Division of Biologics Standards at the National Institutes of Health, Bethesda, Maryland. He is a career Public Health Service Officer with an extensive background in infectious disease research and immunology and has served as Director of the Rocky Mountain Laboratory, NIH's largest permanent field station. Dr. William G. Workman will serve as Assistant Director of the new Division.

INDIAN HEALTH SERVICE TO PHS

The responsibility for the medical care of 350,000 Indians has been tranferred from the Department of Interior to the Public Health Service under Public Law 568, 83rd Congress. This transfer was effective on July 1.

A Division of Indian Health has been created to administer the program. Dr. James R. Shaw, a Public Health Service officer, who has headed the Indian health program for the past two years in the Bureau of Indian Affairs, will continue in this capacity as chief of the new division. His assistant chiefs are Dr. Frank French and Dr. Joseph Dean. There are about 3600 employees in hospitals and area offices who have also been transferred with the program.

Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, in commenting on the transfer said: "Although communicable diseases among most Americans generally have yielded to modern medical treatment and public health measures preventable illnesses are accounting for half the deaths among Indians who live on reservations. In 1950, the average age at the time of death among these people was only 36. In contrast it was 61 among the white population. Our immediate task is to control the diseases that are taking this toll."

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.
Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

ASSIGNMENTS

Dr. Wilson C. Williams, Chief of Professional Services at the Veterans Administration hospital in Nashville, Tenn., has been appointed manager of the hospital. He succeeded Dr. Wibb E. Cooper who retired on June 30. Dr. Williams received his medical degree from Vanderbilt University School of Medicine in 1925. In World War I, he served as a private in the Army and in World War II as a colonel in the Army Medical Corps.

Dr. Robert E. Stewart, who has been Assistant Director, has been appointed Director of the Prosthetic and Sensory Aids Service in the Department of Medicine and Surgery. He succeeded Dr. Augustus Thorndike who resigned on June 30 to return to Harvard University as chief surgeon to the Department of Hygiene (Student Health).

Dr. Stewart received his dental degree from Creighton University in 1929. He organized the Veterans Administration program in artificial facial and body restorations.

DENTAL CARE

Dental outpatient care for veterans, previously provided on a year to year basis under Congressional appropriations, will in the future be provided on a permanent basis by an Act of Congress. The dental care to be given pertains to service connected disabilities.

Miscellaneous

AMERICAN COLLEGE OF CHEST PHYSICIANS

At the recent meeting of the American College of Chest Physicians Doctor James H. Stygall, Indianapolis, Ind., was elected President; Doctor Herman J. Moersch, Rochester, Minn., is President-Elect; Maj. General George E. Armstrong will serve as Governor of the College for the Army; Captain Clifford F. Storey, Portsmouth, Va., as Governor for the Navy; and Dr. Roy A. Wolford, Washington, D.C. as Governor for the Veterans Administration. The 22nd Annual Meeting of the College will be held at the Sherman Hotel, Chicago, Ill., June 7-10, 1956.

INDUSTRIAL MEDICINE COURSE

The Post Graduate School of New York University-Bellevue Medical Center is offering an 8-week course in industrial medicine for physicians beginning September 26. Applications should be made to The Dean, 550 First Avenue, New York 16, N.Y.

POSTGRADUATE GASTROENTEROLOGY

The American College of Gastroenterology has announced that its Annual Course in Postgraduate Gastroenterology will be given at The Shoreland in Chicago on October 27-29. For further information write to the American College of Gastroenterology, Dep't. P.G., 33 West 60th St., New York 23.

MEDICAL EDUCATION FILM

"Danger at the Source" is the first documentary film produced as a public service by Fox Movietone for the National Fund for Medical Education. This is a black and white film, 16 mm. sound, with running time of 13½ minutes, and can be procured free of rental fee. It is suitable for public showing to lay and professional audiences. Address: FILM, National Fund for Medical Education 2 West 46th St., New York 36, N.Y.

UROLOGY AWARD

The American Urological Association offers an annual award of $1000 (first prize of $500, second prize $300 and third prize $200) for essays on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been graduated not more than ten years, and to men in training to become urologists.

The first prize essay will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Statler Hotel, Boston, Massachusetts, May 28-31, 1956.

For full particulars write the Executive Secretary, William P. Didusch, 1120 North Charles Street, Baltimore, Maryland. Essays must be in his hands before December 1, 1955.

DIABETIC COOKBOOK

The Diabetic Cookbook, containing over 250 recipes for foods that diabetics can eat and enjoy will be published in September. The author, Mrs. Clarice B. Strachan, of Tulsa, Oklahoma, developed and proved the recipes over a period of 14 years during which she cooked for her diabetic son. Dr. Charles H. Best says, "I have no hesitation in recommending this book most highly and I feel sure that a very large number of diabetics—and their families—will welcome its publication and will profit by reading it."

The book is to be published by The Medical Arts Publishing Foundation 1603 Oakdale Street, Houston 4, Texas, and will sell for $6.50.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Capt. Donald F. Callaghan, MSC, USA
Lt. Col. Wister L. Graham, USAF (MC)
J. Hanenson, M.D.
Capt. Geraldine Hellen, USAF (NC)
Col. Amos R. Koontz, MC, Md. NG.,
Sr. Scientist David B. Lackman, USPHS
1/Lt. Paul H. McFarland, Jr. DC, USA
Major M. Shaner, USAF (DC)
Capt. Jose M. Vidal Yebra, MC, Cuban Army

BOOK REVIEWS

LOCAL ANALGESIA: BRACHIAL PLEXUS. 3rd Ed. By R. R. Macintosh, M.A., D.M., F.R.C.S., University of Oxford; and Wm. W. Mushin, M.A., M.B., M.R.C.S., Professor of Anesthetics, University of Wales. 62 pages with 32 illustrations. E. & S. Livingstone, Ltd., Edinburgh and London. (In U. S.—Williams & Wilkins, Baltimore.) 1954. Price $3.00.

This small volume is now in a third edition after initial publication in 1944. This is a great tribute to both the subject and the method of presentation. The supraclavicular approach to the brachial plexus is discussed after brief mention of the infraclavicular, axillary and paravertebral approaches. The discussion advances through history, indications, principles of technic, premedication, instruments, local anaesthetic solutions, position, skin wheal, injection of the plexus, onset of analgesia, the stellate ganglion and complications. A brief presentation of Xylocaine and Hyaluronidase is added to this edition which in other respects resembles the 1947 edition.

The excellence of this presentation is due to the masterfully accomplished anatomical drawings showing details of the regional anatomy and the technic of injection. Explanations of diagrams are on opposing pages for easy study. The entire volume is clear and pertinent, the bibliography is adequate, and no index is needed.

Every physician who administers regional anesthesia or instructs in regional methods should read this book. A uniformly high rate of satisfaction blocks is assured if the method is followed.

LT. COL. ROBERT E. LAU,
USAF (MC)

SEGMENTAL ANATOMY OF THE LUNGS. By Edward A. Boyden, Ph.D., Professor Emeritus of Anatomy, University of Minnesota Medical School. 276 pages, illustrated. McGraw-Hill Book Co., Blakiston Division, New York. 1955. Price $15.00.

The author presents in textbook form anatomical experiences of over 40 years. He discusses, with diagrams, advancement of knowledge of embryology and development of the bronchial tree; gives a critical review of nomenclature and offers some revisions, including a uniform system of numbering related bronchi, arteries, and veins. With this background Dr. Boyden proceeds into his main thesis.

Each segment of the lung, lobe by lobe, is examined in detail, not only bronchi which have been the subject of many previous discussions, but arterial and venous supply. The usual relation of airway and blood vessels is demonstrated and then, even more importantly, frequent variations. All these are done with profuse illustrations, including line drawings by the author, diagrams, and numerous color plates.

This book will be a valuable addition to the personal bookshelf of anatomists and thoracic surgeons. It will be of special help to chest physicians, roentgenologists, and bronchologists and would be an excellent reference book for medical libraries.

EDMUND G. BEACHAM, M.D.

CHRISTOPHER'S MINOR SURGERY. 7th Ed. Edited by Alton Ochsner, M.D., F.A.C.S., Chairman of the Department of Surgery, Tulane University of Louisiana School of Medicine; and Michael E. DeBakey, M.D., F.A.C.S., Chairman of the Department of Surgery, Baylor University College of Medicine. 547 pages, illustrated. W. B. Saunders Co., Philadelphia, and London. 1955. Price $9.00.

This standard text has been entirely redone by Doctors Ochsner and DeBakey with nineteen other contributors, largely from the staffs at Tulane and Baylor Universities. After chapters on general topics such as equipment, surgical considerations, dressings and bandages, anesthesia and resuscitation, and a dissertation on the surgical resident, there are chapters on the various conditions which constitute "minor surgery," presented in regional fashion or by systems. The presentations are adequate, generally non-controversial, and the bibliographies are sufficient. The paper and binding are excellent and the clear illustrations are well reproduced. The format is convenient

and the index satisfactory. The book is well done and is recommended as a worthy continuation of this long standard work.

COL. WARNER F. BOWERS, MC, USA

POTASSIUM METABOLISM IN HEALTH AND DISEASE. By Howard L. Holley, M.D., Department of Medicine, University of Alabama; and Warner W. Carlson, Ph.D., Department of Biochemistry, University of Alabama. 131 pages. Grune & Stratton, New York and London. 1955. Price $4.50.

This is No. 12 in a series of Modern Medical Monographs and is a splendid summary of current knowledge of potassium metabolism and the vital role of this action in health and disease.

Normal potassium values are clearly presented with emphasis on the intracellular and extracellular action of this electrolyte on cell metabolism, muscle function, and nerve metabolism with detailed description of the absorption, circulation, and secretion of the potassium ion. The second section is devoted to potassium deficiencies followed by an excellent clinical and biochemical presentation of potassium excess. One minor error in a chemical formula appears at the top of page 69; otherwise, this monograph is well nigh letter-perfect and should prove to be a very valuable addition to the bioclinician's library.

The appendix deserves a special word of praise because it contains a practical compendium of units used in body fluid measurements together with a condensed, practical statement of the potassium content of various foods and diets.

The authors state "the purpose of this monograph is to present a review of this complex subject which may serve as a practical clinical guide in the diagnosis and treatment of abnormalities in potassium metabolism." Careful review indicates that the purpose has been admirably fulfilled.

CAPT. CHRISTOPHER C. SHAW, MC, USN

1955 MEDICAL PROGRESS. Edited by Morris Fishbein, M.D., 28 contributors. 346 pages. The Blakiston Div., McGraw-Hill Book Co., Inc. New York, Toronto, London. Price $5.00.

Developments in research, diagnosis and treatment in all medical specialties during 1954 are reported herein by 28 medical authorities. Here are just a few of the highlights. Diamox, fifty times more active than sulfanilamide, is efficacious in such edematous states as congestive heart failure, emphysema, liver cirrhosis, nephrosis and glaucoma. Chlorpromazine (Thorazine) is considered valuable in certain mental disturbances and in producing hypothermia. Postcholecystectomy x-ray visualization of the bile ducts is improved by cholografin. The somascope combines the principles of sonar, radar and television in helping reveal goiters, cysts and tumors. Hypothermia permits improved cardiac surgery. Liberalization of Caesarean section saves many babies formerly lost by difficult forceps deliveries.

Among many other interesting subjects are facts about: (1) Rauwolfia (2) Various forms of cortisone (3) Penicillin and other antibiotics (4) Salk polio vaccine (5) Coronary thrombosis referred to as "Manager's Disease" (6) Whiplash injury of the neck and (7) Retrolental Fibroplasia.

Physicians will find valuable information about every facet of medicine in this volume.

COL. H. P. MARVIN, USA, RET.

CLINICAL DISORDERS OF HYDRATION AND ACID-BASE EQUILIBRIUM. By Louis G. Welt, M.D., Professor of Medicine, Department of Medicine, University of North Carolina. 249 pages. Little, Brown and Company. Boston and Toronto. 1955. Price $6.00.

Most physicians are well aware that many advances have been made in the past decade in the biochemistry of body fluids, although the practitioner may not understand the therapeutic significance of this newer knowledge. Medical students, internes and house officers recognize the importance of salt and water balance in the maintenance of homeostasis in the patient from the viewpoint of a biochemical approach to the specialty of physiology.

This book serves a twofold need: it provides a sound, scientific foundation for the physiologic concepts of hydration and acid-base equilibrium and it presents a practical approach to clinical management of dehydration, edema, electrolyte imbalance, acidosis, alkalosis and acute renal insufficiency.

The first section of the book is devoted to physiologic considerations; the second to clinical manifestations on the basis of altered physiology. Yet, there is no "gap" between the two divisions of the text, which is concise, informative and well-written throughout. This excellent monograph crystallizes current knowledge in bioscience of vital importance to the clinician, the student and the patient.

CAPT. CHRISTOPHER C. SHAW, MC, USN

DIFFERENTIAL DIAGNOSIS OF INTERNAL DISEASES. 2nd Rev. Ed. By Julius Bauer, M.D., F.A.C.P., Clinical Professor of Medicine, College of Medical Evangelists, Los Angeles, Calif. 987 pages. Grune & Stratton, Inc. New York and London. 1955. Price $15.00.

The first edition of this textbook came out in 1950. It is obvious that the author is a teacher, as he presents each subject in a very logical manner and ends each chapter with a summary and list of references. This book is divided into two parts. The first part discusses the leading symptoms, the second part the leading signs.

As the author very rightly states in his preface, from thirty to sixty percent of all patients going to an internist have problems which are more or less psychogenic, but they can not all be referred to a psychiatrist. Therefore, the internist in a "minor" degree must practice psychiatry. He further states in his preface that out of two thousand consecutive cases seen in his office, 32.3 percent had to be diagnosed as pure neuroses or psychoneuroses of one type or another. He emphasizes that the diagnosis of these cases must be established by the general practitioner or internist, since he, and not the specialist in psychiatry, is consulted by these patients. The author further points out that the competent physician must rule out diagnostic possibilities other than neurosis and must disentangle complex psychosomatic ailments as to their somatic and neurotic component. Dr. Bauer goes on to state, "Who, then, should teach the art of psychodiagnosis and minor psychotherapy? How should it be taught? The fundamentals of psychobiology and psychopathology must, of course, be taught by the psychiatrist, who is, also, the only competent authority to handle the relatively small group of severe psychoneurotics who do not respond to 'minor' psychotherapy. Having acquired the basic knowledge of human nature and its pathologic distortions, the student must learn the approach, differential diagnosis and treatment of neurotics by watching his teacher in internal medicine—not in didactic lectures and, for obvious reasons, usually not in the wards, but in the outpatient department. Study of characteristic case histories is an equally important method of learning the art of minor psychotherapy. This is the reason that, in this book particularly, case histories of psychosomatic diseases are used to illustrate the text."

This book is very well indexed and is thorough in its discussion of each sign and symptom and would be a ready reference to any physician and surgeon interested in the proper diagnosis of a pathological condition.

CDR. JAMES L. MCCARTNEY,
MC, USNR (RET.)

POMP AND PESTILENCE; INFECTIOUS DISEASE, ITS ORIGIN AND CONQUEST. By Ronald Hare, M.D. 224 pages. The Philosophical Library, Inc. New York. 1955. Price $5.75.

In a very clear style, Dr. Hare, professor of bacteriology at St. Thomas Hospital Medical School (Univ. London), narrates the story of bacteria, infectious diseases and of the reactions individuals and communities showed against these enemies of health. At the first casual glance, the book looks too popular, too laymanish. In the first chapter there seems to be much divergence from the main story, much explanation as if the author were uncertain of the type and educational level of his prospective readers. But a conscientious reading and scrutiny of the informations and their sources must convince anyone that the author is an expert of his subject as well as an artist of English composition. He is a good storyteller. There may be larger works, more exhaustive treatises of the history of epidemics such as the works of Haeser, Hecker, Hirsch, Creighton, and others, but there is none that would treat the subject as skillfully and adroitly, within the range and scope of a concise compendium as the book of Dr. Hare.

The narrative of the author is arranged in seven chapters in which he ably unfolded all problems of his very broad subject field and pursued them from the hypothetical origin of the first germs to the very modern geopolitical implications of the conquest of infectious disease in the back alleys of civilized Asia. While the first pages of his book, which talk of the birth of the first bacterium and its first attack on man and its first spread into epidemic, are full of conjectures, probabilities and maybe's, he reaches a more solid ground after passages from the world of Saurids and Stone Age into historical times. Nevertheless, even the hypothetical discussions are interesting, though the reader might sometimes disagree with the author's explanations.

Some of us will particularly enjoy chapter 3 where, in discussing the individual major infections and their past epidemics,

Dr. Hare gives sufficient detail to make his text interesting even for the professional historian of medicine. Indeed, many episodes which he tells are not to be found in the common English textbooks of medical history. It is, for instance, not common knowledge how, in the 2nd century A. D., the smallpox knocked out the Roman Army after the Parthian Wars, and thus laid the entire Empire open to raids by German tribes, relatively amateurs in the art of warfare (p. 75-79). It also gave Galen an opportunity to introduce various preventive measures at the Headquarters at Aquileia. The author makes it indeed probable that this epidemic might have been the real starting point in the decline of the power of Rome. If it were so, then the decline must have been hastened by the dysentery in the 3rd century, and the *coup-de-grace* was delivered to the Empire by the plague in the 6th century.

We also learn that before the European outbreak of Black Death in the 14th century, in 1345 the Tartars launched a sort of bacterial warfare against the Italian inhabitants of the Crimean port of Caffa, by hurdling a number of plague-stricken bodies of dead Tartars into the city. We read about the history of other infectious diseases, about rickettsiasis and Russian lousiness, about the export in 1889 of influenza from Turkestan, together with the Bokhara rug, etc. We note that epidemics formerly used to help in solving the problems of overpopulation. The book ends in a tune truly British, a lamentation about the disintegration of the British Empire and its dire consequences in the former colonies, or the modern dilemma—either a backward trend in death from disease, or a sanitary awakening with more children, less infection, less food, and more death from starvation.

There is very little to object to in the book. It is perhaps natural that a narrative of a British author is inclined to pick its heroes from Britishers. Thus, the merits of John Snow in the study of cholera in 1854 are described in great detail, while it is omitted that next year (1855) the cholera vibrio was discovered by the Italian Filippo Pacini. There are some spelling inaccuracies in Latin personal names (Heironymus, Guidonis de Chauliaco, etc.) John Caius (1510-1573) should not be called a "medieval" physician. By the way, it is no more scientific to refer to the Middle Ages as the Dark Ages.

Among the author's Notes and References (p. 203-217) I missed chiefly the historical works of Sticker, and—as to data from the medical history of the American conquest—the writings of P. M. Ashburn (cf. his *The Ranks of Death*, N.Y., 1947). Ashburn, for instance, quoted several positive evidences to show that tuberculosis had been an infectious disease among the Indians of the pre-Columbian Era, which disapproves some of Dr. Hare's conclusions related to this topic.

The book is provided with a good, but not too exhaustive Index of names and subjects. The work has been faultlessly produced (printed) in London, by the Camelot Press, Ltd. It was designed for general reading and for wide circulation rather than for serious study and for the few reference shelves of historians. One wonders why the book is not illustrated, which would be rather a pleasant attraction, adding to the propaganda value of such eyecatching title as the alliterative puzzle: Pomp and Pestilence.

CLAUDIUS F. MAYER, M.D.

FOETAL, INFANT AND EARLY CHILDHOOD MORTALITY. Vol. I. Statistics by Dr. Joseph V. DePorte of the Dept. of Health of the state of N.Y. Vol. II. Biological, Social and Economic Factors prepared with editorial advice of Dr. Louis I. Dublin, Consultant on Health and Welfare, Institute of Life Insurance, N.Y. Dept. of Social Affairs, Population Division, United Nations Publications, N.Y., N.Y. 1954. Price Vol. I, $1.50; Vol II, $.40.

This study consisting of two volumes is a partial implementation of a resolution adopted by the Economic and Social Council, requesting the Secretary-General of the United Nations to provide means of supplying population studies to effect a greater comparability of basic data relating to infant mortality. This study is concerned with the loss of life after fertilization of the ovum but before the child has reached the fifth year of age.

Volume I indicates the sources of the statistical information, the extent and limitations of data available, the problems involved in improving statistics and examination of some of the problems of analyzing and interpreting the data.

Volume II is an evaluation of the underlying (non-medical) causes of the voluminous wastage of early life and explain the substantial mortality differentials in terms of biological, social and economic factors. An

attempt is made to also indicate the probable economic and demographic costs to society of foetal, infant and early childhood mortality.

The information contained within these two volumes is of particular interest to international, national and local agencies who are devoting their energies to the attainment of low prenatal and early childhood mortality.

COLONEL JOHN W. DARROUGH,
MEDICAL CORPS, USAR

STANDARD METHODS FOR THE EXAMINATION OF WATER, SEWAGE, AND INDUSTRIAL WASTES. Prepared and published jointly by American Public Health Association, American Water Works Association, and Federation of Sewage & Industrial Wastes Associations. 10th ed. 522 pages. American Public Health Association, 1790 Broadway, New York. 1955. Price $7.50.

Just fifty years ago, in 1905, the American Public Health Association issued the first edition of its *Standard Methods for Water Analysis.* Twenty years later, in 1925, the 6th edition of this widely accepted text was broadened to include both water and sewage, and the American Water Works Association became a co-sponsor. The 8th edition, in 1936, was further expanded to include analytical methods for industrial wastes, as developed by the Federation of Sewage Works Associations.

The present 10th edition, commemorating the publication of the original volume half a century ago, contains much new material and is more conveniently arranged than previous volumes. It is divided into six parts, the first four being concerned with physical and chemical examinations of water (I), sewage (II), industrial wastes (III), and sludges and bottom sediment (IV). Part V presents standard methods for the bacteriological examinations of water and sewage, while Part VI, all of which is practically new, discusses biological examinations of water, sewage, and sludge.

The book is very well printed, has a good index, and contains 12 pages of excellent illustrations of organisms. This valuable text, an authority for fifty years, will be indispensable to all military and civilian health officials, laboratory workers, sanitary engineers, and others concerned with the examination and control of water, sewage, and industrial wastes.

COL. JAMES A. TOBEY, USA (RET.)

ION EXCHANGE AND ADSORPTION AGENTS IN MEDICINE. By Gustav J. Martin, Sc.D., Research Director, The National Drug Co. 332 pages, illustrated. Little, Brown & Company, Boston and Toronto. 1955. Price $7.50.

The basic chemistry of ion exchange resins and their effect upon the chemical reactions of the body are exhaustively presented by the author. The bibliography is adequate and the literature of this fascinating development in chemistry is reviewed with care and presented in readable fashion. In the clinical sections the author presents the employment of these agents in therapy of peptic ulceration, electrolyte imbalance and ulcerative colitis in capable manner, but does not tell us how we are to get the patient to accept the medication. There is also a fine section on chelation. This book is recommended for the biochemist and for the clinician who has special interest in biochemistry.

COL. RYLE A. RADKE, USA, RET.

PROLONGED AND PERPLEXING FEVERS. By Chester S. Keefer, M.D., Physician-in-Chief and Director, Evans Memorial Hospital, Boston; and Samuel E. Leard, M.D., Instructor in Medicine, Boston University School of Medicine. 248 pages. Little, Brown & Co. Boston. 1955. Price $5.50.

After one has treated a patient with fever for two weeks or longer, and found no reason for the fever, what then? It might help if this book were consulted. The experience of the authors plus that of others who have been interested in the subject of fever of obscure cause makes for a well needed source book. In spite of its short length, this volume contains all the pertinent data required to track down the etiology of obscure fever.

By far, the best chapter is "Diagnostic Procedures." In it a planned program of investigation is outlined. The history, the physical examination, laboratory examinations, and diagnostic tests are explained in full. If the physician follows the routine he will probably find the cause of the fever.

The volume has three parts. Part one discusses variations in normal body temperature and diagnostic procedures. Part two contains infectious fevers; and part three is composed of noninfectious fevers.

An adequate bibliography, a clearly written text, and many case histories make this unique volume a welcome addition to any physician's library.

PHILIP H. SMITH, M.D.

INDUSTRIAL FERMENTATIONS. VOLUME II. Edited by Leland A. Underkofler, Ph.D., Professor, Chemistry Department, Iowa State College; and Richard J. Hickey, Ph.D., Research Microbiological Chemist, Commercial Solvents Corporation. 578 pages. Chemical Publishing Co., Inc., New York. 1954. Price $12.00.

The first volume of this series dealt largely with the production of ethanol by fermentations, discussed the brewing industry, wines, yeasts; then took up the preparation of glycerol, butanol, lactic and citric acids, gluconic, fumaric and itaconic acids. In this volume 14 experts have continued discussions of fermentation procedures, processes and products. This compilation has been prepared primarily for industrial workers and students interested in fermentation processes.

The first part deals with microbiological ketogenic processes from various substrates with the production of various types of ketone derivatives including kojic acid. This is followed by an effective discussion of the production of butanediol, stressing its importance in World War II, chemical and physical properties, derivatives, physiological properties, methods of determination, natural occurrence, and practical details required for laboratory and for pilot plant production. The yield and the types of organisms and of substrates for successful production are compared, and the costs for various processes estimated.

The third section deals with the production of a large number of enzymes, fungal and non-fungal in nature. The fourth section deals with production of riboflavin and of B complex, B_{12} and ergosterol. This is followed by descriptions of procedures for producing penicillin, streptomycin, broad-spectrum and other antibiotics. This is well connected to flow diagrams for fermentation, adsorption, elution and purification of these products. One feature of this section is the listing on pages 334-358 of antibiotics, their source, chemical nature, activity and toxicity.

The final section summarizes information regarding dextran, l-ephedrine production, and the action of various microorganisms on steroids; lactic acid fermentation of cucumbers, sauerkraut and olives. A chapter is devoted to methods of selection and maintenance of cultures, and another sheds some light on cultural variation and genetics! Finally, the book closes with a very helpful report on fermentation in the treatment of various types of municipal wastes, sewage, etc.

The index of 22 pages appears adequate, being arranged by organisms, products and preparations. Each chapter carries its own bibliography, and there appears to be some thousand references included in the volume. It is excellently bound and should stand a good deal of mis-treatment when being used in libraries or in plants interested in industrial fermentations.

JAMES C. MUNCH

PREFRONTAL LEUCOTOMY AND RELATED OPERATIONS: ANATOMICAL ASPECTS OF SUCCESS AND FAILURE. By Alfred Meyer, M.D., Professor of Neuropathology; and Elizabeth Beck, Research Assistant, Institute of Psychiatry University of London. 68 pages, Illustrated. Charles C Thomas, Springfield. 1954. Price $2.25.

This book is concerned with an analysis of the clinical and anatomical data of one hundred two brains obtained from patients who lived at least five months following some form of psychosurgery. The authors have succinctly reviewed the several psychosurgical procedures and the theories that have been developed to explain the results of these operations. A comprehensive bibliography is included.

They report that a few facts of some interest have clearly emerged from their analysis. Firstly, predominantly affective and paranoid conditions fared better than schizophrenics. Secondly, there is a definite and considerable preponderance in the amount of frontal lobe isolated in the improved or recovered cases as compared with the unimproved group. They point out, however, that there is a point of diminishing returns beyond which increasing the amount of frontal lobe isolated produces undesirable personality changes which more than offsets the therapeutic improvement resulting from a more posterior cut. The full cut required to relieve manic symptoms resulted in excessive personality change. There is also a conspicuous positive correlation between severe cortical damage and severe personality change. Quantitative adequacy of the cut is not the only decisive factor. Cingulectomy, for instance, is effective mainly in obsessional neuroses but in the major psychoses it seems to fail invariably. Cutting the dorsal, and particularly the dorso-lateral sectors of white matter does not appear to be as significant for improvement as the mid-central, orbital and cingulate sectors. On the other hand involvement of the dorso-lateral and lateral white matter appears to be one of the factors

responsible for severe personality change. The authors report that the thalamo-frontal projection which carries fibers to all the anterior prefrontal areas is at the tip of the anterior horn situated in close vicinity to the medial orbital segment. They believe that the increased effectiveness claimed by Greenblatt and Solomon for their bimedial cut and by Thorpe and Hardman for their lower quadrant cuts is probably due to the quantitative isolation of the prefrontal region rather than to the specific effects which Fulton thought these cuts might have on the visceral brain. It is concluded that Freeman's question as to whether the frontal lobe functions by mosaic or by mass action still awaits a wholly satisfactory answer.

This is the largest number of brains ever to be studied from patients who had undergone psychosurgery. The authors have meticulously recorded their data. The photographs and microphotographs are well chosen and reproduced. This volume is a most welcomed beginning to the correlation of clinical illness, anatomical lesions and post operative courses which must eventually be made on a large number of patients in order to make a final determination of the proper place for psychosurgery in the treatment of mental illness.

COL. WILLIAM E. WILKINSON, MC, USA

THE COAGULATION OF BLOOD. Methods of Study. Edited by Leandro M. Tocantins, M.D. 240 pages. Grune and Stratton. New York. 1955.

This book on material and methods for studying the phenomenon of blood coagulation has been written primarily by the members of the National Research Council's Panel on Blood Coagulation. They have been aided by the liaison members from the Canadian Defence Research Board, their own associates, and a few other interested investigators.

The material has been divided into 13 chapters and an appendix giving synonyms for components influencing blood coagulation and general references on the subject. The various sections of each chapter also contain references to original literature. Chapter I covers the very important subjects of processing of blood for coagulation studies and special methods of glassware and reagent preparation. Of equal importance is the technician's ability to carry out the exacting procedures that have been and are being developed in this special phase of hematology. This is approached in Chapter II by outlining some 21 exercises designed not only to familiarize the technician with these procedures but also acquaint him with the language and facts of the subject. Chapters III and IV cover the determination of the clotting time of whole blood and the measurement of the rate and extent of clot retraction. Chapter V covers blood platelets, their enumeration and special methods of handling incident to special studies of their role in blood coagulation. Estimation of plasma thromboplastin and precursors is given in 7 sections of Chapter VI. Methods of estimation and assay of prothrombin and precursors are to be found in Chapter VII. This is supplemented by methods for the determination of the accessory plasma or serum coagulant factors in Chapter VIII. Chapters IX and X contain methods of estimation of fibrinogen and tests for fibrinolysin and antifibrinolysin. The last three chapters cover tissue coagulents and the anticoagulants in blood.

It is believed that this volume will be very useful to those who are not actively engaged in the field of blood coagulation. The procedures described are ones that yield valuable general information and they are presented in sufficient technical detail.

LT. COL. JOS. H. AKEROYD, MSC, USA

THE MICROPHYSICAL WORLD. By William Wilson, Ph.D., 216 pages. Philosophical Library, New York, 1954. Price $3.75.

The author of this small book is Professor Emeritus of Physics in the University of London. He is thus well qualified to write on that part of physics now popularly known as "nuclear physics." It should be said at the outset, however, that this is not another book on the atomic bomb.

This book is concerned with the ultimate particles of the universe, atoms, protons, electrons, etc., what we know about them, and also how this knowledge has been acquired.

In 14 chapters the author takes up such topics as the atomic theory of John Dalton, atoms and molecules from the point of view of physics, spectra, cathode rays, x-rays, and electrons, radiant heat, the hydrogen atom, the helium atom, the electron orbits of atoms, etc.

Those who may require a refresher in atomic physics or who may wish an introduction to the subject as a basis for more serious study will find this book useful.

MORRIS C. LEIKIND

ADVANCED SURGERY OF CATARACT. By Daniel B. Kirby, M.D., and A.C.S. Professor Emeritus of Ophthalmology, New York University College of Medicine (former Chairman of the Department). 217 pages with 138 figures in black and white, and 96 illustrations in full color. J. B. Lippincott Co., Philadelphia and Montreal. Price $27.00.

This treatise is the quintescence of a long and productive career of one whose chief interest was centered largely in cataract. In the work, the author covers the advances as found in the current literature, including a discussion of the Ridley lens, the advances in diagnosis, examination, preparation of the patient, Curare akinesia, technique of grasping the lens, breaking the zonule, intracapsular extraction and prevention of complications.

On the controversial points, the author has presented his views with logic, with thoroughness and in a convincing manner. His most enthusiastic supporters are to be found among his students. There will be some who do not agree with the author in all his concepts. The placement of sutures in a soft, opened eye which may be oozing vitreous will not appeal to all ophthalmologists. Neither will the use of Curare for akinesia, advocated by the author in a majority of patients, be agreeable to all. Suffice it to say, though, Curare is a great adjunct at times in the hands of a competent anesthetist.

There will also be those who differ with the author in regards to his method of grasping the lens in its superior portion for extraction. For those who have seen the results of the Kirby Technique, there will be little but admiration, although this technique may require greater skill and experience.

For those who are unfamiliar with the Kirby instruments and modifications which he has developed, the perusal of Chapter 5 on *Perfected Instrumentation and the Handling of Ocular Tissue,* may be found to be worth the price of the book.

There is an excellent bibliography and this work is replete with the presentation of the opinions of others as well as those of the author.

There will be only a few in the field of Ophthalmology who will not benefit by this excellent and praiseworthy contribution made by a master cataract surgeon.

ARNOLD A. ALBRIGHT, M.D.

CEREBRAL VASCULAR DISEASES. Transactions of Conference held under auspices of American Heart Association—1954. Irving S. Wright, M.D., and E. Hugh Luckey, M.D. 167 pages. Grune and Stratton, New York and London. 1955. Price $5.00.

A conference on cerebral vascular diseases was held under the auspices of the American Heart Association in January 1954. Dr. Irving S. Wright was the chairman and many authorities were participants. This book is a transcript of that conference and is practically a verbatim record of the proceedings. The editor chose this form in an effort to provide the reader with part of the personal stimulation received by those who took part in the discussion.

The subjects covered were: the sociologic, economic, and personal significance of cerebral vascular diseases; embryology of the cerebral circulation; anatomy of the cerebral circulation and its clinical significance; pathology of cerebral vascular diseases; physiology of the cerebral circulation, brain chemistry; hypertention and its effect on the cerebral circulation; atherosclerosis and its effect on the cerebral circulation; neurologic aspects of cerebral vascular diseases and therapeutic approach; emotional problems of cerebral vascular diseases; electroencephalographic studies and their significance in cerebral vascular diseases; neurosurgical aspects and therapeutic approach to cerebral vascular diseases; anticoagulants and their place in the treatment of cerebral vascular diseases; rehabilitation.

This conference was an effort to overcome the completely negative approach to a patient who has had a cerebral vascular lesion. New concepts and new facts are brought out. For example: animals practically never get cerebral vascular accidents; although the human brain makes up only 2% of the total body weight, it receives 17% of the total cardiac output; the so called "little strokes" discussed by Alvarez are frequently confused with an anxiety state.

Even though there is no adequate treatment for patients with cerebral vascular accidents, this volume is a hopeful step in the right direction.

PHILIP H. SMITH, M.D